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Now this is clearly good news for you. And your CFO. But most importantly, perhaps, for the person who will sit in front of them all day.

You see, our XV Series of monitors, like all MultiSyne monitors, are truly designed for the eyes. The eyes of an overworked administrator, a slightly frenzied manager, a number-crunching analyst.

These eyes demand sharp detail, bright colors, and crystal-clear images. Which is precisely what these MultiSyne monitors deliver.

For example, they're built with NEC's exclusive FullScan™ capability for images that are sharp and focused all the way to the edges and in the corners.

The MultiSyne XV Series also delivers the legendary quality and reliability you expect from NEC, backed by a three year limited warranty which is one of the best in the industry. Plus, the XV Series is ideal for both PC and Macintosh® systems and offers Microsoft® Plug and Play compatibility.

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FREEZE OVER?

You won't find all this with conventional monitors in this class.

Speaking of typical, everyday monitors, there's one thing you should remember: you don't have to settle for the monitor that comes bundled with the system.

In fact, these days it makes sense to be very selective. For example, we've developed our MultiSync XV17 to optimize today's software applications that are more involved than ever before. There's simply more information which needs to be displayed on the screen.

Our XV17 can accommodate all this on-screen information, and it does it surprisingly better than the typical monitor. Plus, a bigger screen helps eliminate constant scrolling, which can only help overall productivity. And considering all of the advantages of larger monitors, a 17" display won't be obsolete in the near future.

So if you're looking for an affordable high-performance monitor, we suggest the MultiSync XV17, and the entire XV Series. They're designed to go above and beyond your expectations. Not your price range. Call 1-800-NEC-INFO for more information. Or for information sent via your fax, just call NEC FastFacts™ at 1-800-366-0476 and request catalog #1.

The MultiSync XV Series offers optional accessories like the AudioTower™ Speaker System shown.

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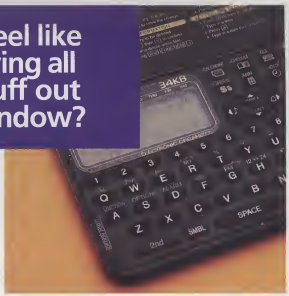

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Exclusive!

The Fastest PC in the World

Faster PCs come along all the time—but not like this one. In our exclusive hands-on preview of Gateway's blazing 120MHz Pentium system, *PC Computing* shows what you can expect from the newest crop of superfast dream machines. **62** Plus: Intel unveils its next-generation CPU. How good is the P6? **36**

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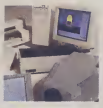

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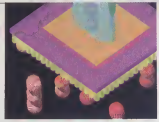

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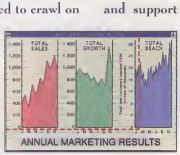

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Coming Soon

Desktop Superguide It's time to buy a new system. Shopping should be a joy, not a hassle. To help you determine which system best fits your needs, *PC Computing* runs benchmark performance tests on over 40 systems and evaluates the quality of their monitors. We also look at printers, sound cards, scanners, modems, and CD-ROM drives.

PC SYSTEMS Want to know which system is the easiest to use and maintain? Turn here. We put more than 40 systems through our barrage of usability and performance tests.

PRINTERS With prices dropping, every PC can have a printer. We evaluate laser, ink jet, and dye sublimation models so you can choose the right printer for the job at hand.

PERIPHERALS How do scanners, sound cards, modems, and CD-ROM drives stack up? When it comes to outfitting a PC with all the extras, you'll find all the information you need in this section.

Windows 95 With all the hype surrounding Windows 95, *PC Computing* tests a special preview version for compatibility, performance, and networking to see how it compares with OS/2 Warp, Windows NT, and Windows 3.1.

ALSO NEXT MONTH

Crossroads Which communication standard will prevail: V.34 or ISDN?

Working Smarter Secrets for keeping your hard disk healthy.

Do It Yourself Vince and Woody help you create a DDE link between Lotus Organizer and Microsoft Word.

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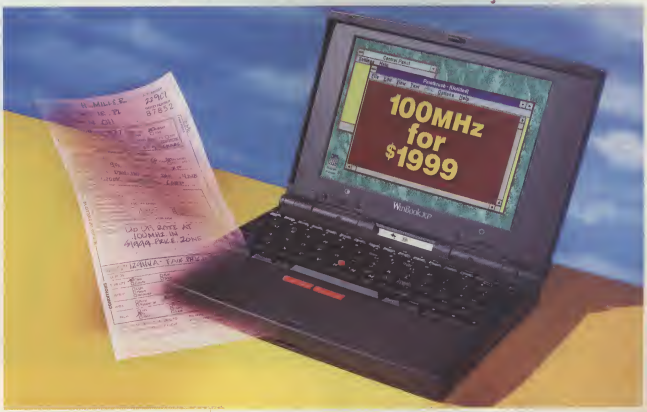

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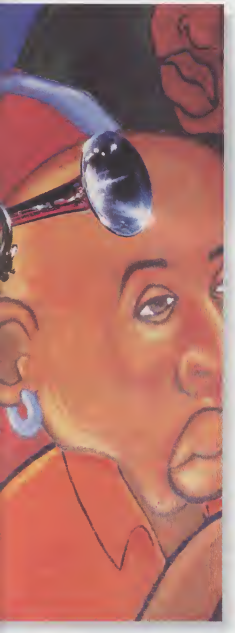

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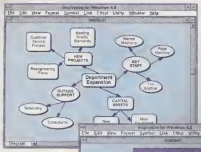

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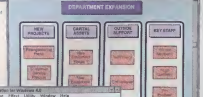
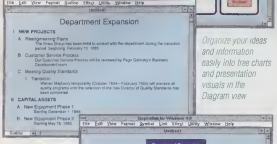


Inspiration's intelligent diagram view lets you instantly enter your ideas.



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—*Windows Magazine*
September 1994

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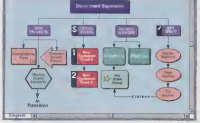

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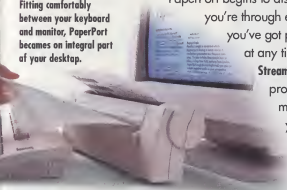

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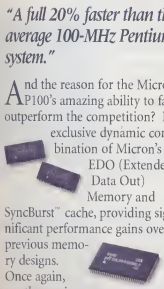

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intel inside pentium

Higher Score Represents Better Performance	WINSTONE 95 (Score)
MICRON P100 MILLENNIA	177
Dell Dimension XPS P100	150
Gateway 2000 P5-100XL	145
HP Vectra XU5/100C	161
IBM PC 750-P100	162

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Bugs are biting my software—what should I do? Check out our new Bug Bytes section on page 42 for the lowdown on major application bugs and their fixes.

Shopping Shortcut

Gimme an "A": The A-List (in Pulse) is our new one-stop shopping list for the best of everything—from systems to software. It's based on the results of our ongoing usability and performance testing, and the latest intelligence on the hottest new products. Reviews Editor Wendy Taylor calls The A-List an "executive summary cheat sheet. It's a great way to deal with colleagues and neighbors who are always asking you what to buy—and why." Next time, just hand them a copy of The A-List.

House of Buggin' and Patchin': Another new section in Pulse is Bug Bytes, a roundup of the latest glitches and gotchas. Even better: Log on to our electronic forums (see details at left), where you'll find the patches and fixes you need.

Under Cover: Our cover story previews Gateway 2000's killer 120MHz Pentium-clone system, offering more proof that yes, Virginia, there is a Santa Claus. The surprisingly affordable P5-120 wowed our usually unflappable Technical Director Adam Meyerson, who logged its record-smashing Winstone score as the fastest Windows machine we've ever tested. But Adam warns against CPU tunnel vision: "A fast clock speed doesn't guarantee a fast system; a single Achilles' heel can drag the whole system down. Make sure it has Enhanced IDE, a beefy L2 cache, and a brawny video card." Not to mention a low-cost upgrade that can boost the performance of practically any system: "Windows for Workgroups 3.11 gives you an instant performance boost of 30 percent or more over vanilla Windows," says Adam.

EDO-centric: Our lead story in Pulse predicts another wave (make that an avalanche) of faster CPUs headed your way—with faster Pentiums and the P6 on tap from Intel facing stiff competition from AMD, NexGen, and Cyrix (and see this month's Crossroads for the scoop on the Power PC). But whoever wins the next round of CPU wars, one chip is a sure thing: extended data out (EDO) memory. Wendy Taylor says that EDO memory is coming on fast, since it's cheaper and about 10 percent faster than conventional RAM. "This is one bandwagon that everybody's going to jump on as fast as you can say 'redesigned motherboard.'"

Dialing for Dilbert: He made comic strip and cyberspace history by putting his daily Dilbert cartoons on the Net. This month, Scott Adams reveals his favorite online hangouts as part of our choosy guide to the 101 best spots on the Internet.

OCR ROI ASAP: In "Paperless Payoffs," we chart the return on investment for tools like fax modems and OCR products that simplify how you deal with documents. If scannerphobia has scared you away from the magic of OCR, you'll be happy to know that Usability Labs Manager George Hackman was amazed by his "out-of-box experience" with Hewlett-Packard's ScanJet 3p during our usability testing: "I expected it to take the better part of a day to install, but it was up and running in 15 minutes!"

Demo of the Month: "You've gotta see this! And, honest, it's not another Web browser," promised Associate Editor Rich Schwerin, dragging me into a demo of Infonautics's Homework Helper. "Just ignore the goofy name," he whispered. I did, and Rich was right: This online search agent (previewed in I-Way Patrol) just might be the killer app that conquers cyberspace.

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Circle 262 on reader service card.

As usual, Team Dennis Conner is well in front of the competition. But then, they have a history of firsts. In 1980 it was the Kevlar sails. In 1987, an innovative hull surface. In 1988, a sail that looked like an airplane wing. All of which resulted in America's Cup victories.

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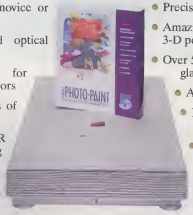

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ARE WE DUMBING DOWN COMPUTERS?

School of Hard Knocks

I hate the Plug-and-Play standard! It makes the computer too easy to use, too easy to upgrade. With add-in cards this simple to install, new computer users will never learn anything about the inner workings of their computers. I've turned my bare-bones PC into a multimedia megamachine—all on my own, without tech support. If I'd had Plug and Play backing me up, I never would have learned anything about DMA channels and IRQs. Heck, I wouldn't even know what they were. Plug and Play makes it easier to upgrade a PC, but it does nothing in the way of educating users about how computers really work.

Wing Gin Lam
via the Internet

Betting beyond Beta

As a beta tester, I couldn't agree more with Ed Bott's assessment of Windows 95. Those of us who have found effective workarounds for the quirks of Windows for Workgroups 3.11 (documented and discovered through tips on ZiffNet) will have a very steep learning curve to be productive in Windows 95. I was so disappointed with Explorer and its inadequacies for managing files that I deleted Windows 95 from my system. It made it too difficult to manage my daily computing chores. My only hope is that the final product will deliver a vastly improved Explorer or an option to use File Manager.

Bill Bishop
via the Internet

Warped Judgment

OK, let me see if I've got this straight: According to Ed Bott's February column, Windows 95 is less useful, more cryptic, and harder to customize than Windows 3.1. Will someone explain to me why I want to upgrade again? I keep forgetting. Or is it just my Warped imagination?

G. Withnel
via the Internet

A WARPED PERSPECTIVE, maybe. My criticisms applied to the Windows 95 Explorer, not to the entire operating system. *Why* do you want to upgrade? Repeat after me: applications, applications, applications. **EB**

The Inevitable O.J. Reference

Your dogmatic reporting of every little useless bit of information on Windows 95 is to Microsoft what the news media is to the O.J. Simpson case. Nothing interests me less (with the possible exception of those subscription renewals you keep sending) than reading about some app that I will probably never use residing on an operating system that has yet to be released. I prefer my computer reading to be more balanced and not kiss up to some corporation for the sake of being first on the beta mailing list.

Douglas McGhee
via CompuServe

ACTUALLY, I'm number 118,481 on the beta list. As for the O.J. case, we're still chasing down the rumor that Judge Ito is running Windows 95 on his IBM ThinkPad. We'll let you know. **EB**

Through Rain and Snow . . .

Regarding Marc Dodge's February Help article on voice mail, videoconferencing, and other means of communications ("Feasibility vs. Information SuperHype," page 244), the phrase *snail mail* is not mutually exclusive with high technology. For the past seven and a half years, I have been a postmaster in a small town. In addition to working in the trenches delivering mail, the U.S. Postal Service has been aggressively exploiting new technology and employing automation methods to process and deliver up to half a billion pieces of mail per day, and meeting the needs of most Americans.

Robert Sternberg
Weare, New Hampshire

. . . The Postmen Ring Twice

I enjoyed the February Help article by Marc Dodge, but his comment, "Would you send an important document via the U.S. Postal Service? Only when it absolutely, positively doesn't have to be there soon," seems lazily prejudiced. He's apparently unfamiliar with the U.S. Postal Service. He also says, "Snail mail is for . . . non-mission-critical routines," and, "it's not great for serving customers."

As a letter carrier, I deliver approximately 4,000 important documents every working day. Those customers get what they need; they are served. You should solicit articles from people who have some conception of reality rather than from techno-morons who have been sniffing around the Ethernet too long.

John E. Cerullo
New Canaan, Connecticut

THE NUMBERS are impressive. Is that you, Cliffy? Cheers! **JOC**

Fair-Weather Camera

Your article in the February issue on the Apple QuickTake 100 digital camera ("You Can Take It with You," page 133) overlooks one important detail: It doesn't like the cold. We use the QuickTake to

snap photos of potential sites for our clients. Within seconds, it lets us download the images to our field reps' portables, then e-mail them to our clients' offices.

Here's the trouble: The QuickTake's batteries lose their charge as soon as the temperature drops below 40 degrees Fahrenheit. Until Apple does something so that the QuickTake can be used outdoors at temperatures down to about 10 degrees, it's only useful for about half of the year in many parts of the country.

David C. Leth
via CompuServe

BRRR. We didn't take the QuickTake with us on our last trip to the Arctic, but we'll keep that in mind next time around. Battery life does vary in different weather conditions. Cold, humidity, and extreme heat can all deplete a battery's charge. **WT**

How the Help Desk Helps

I enjoyed reading your article "Get By with a Little Help from the Desk" in the February issue (Help section, page 222). I'm a management consultant, and I have a client who develops information management systems and provides ongoing help desk services to its clients. We've been looking for good help desk cost-benefit information for a long time. Your article saved the day.

David Wallace
via America Online

IT'S AMAZING how many useful, money-saving ventures *still* need cost justification. **YL**

Less Is More, More or Less

Really enjoyed Gil Schwartz's article "Bottom Fishin'" in the February issue (page 53). The whole idea of distributed processing is that all sizes of processors will be filling all sorts of niches. The notion that everyone will be using the latest Pentium is as crazy as the old belief that one day everyone would be hooking into a mainframe. Even experienced folks can get by for less since they don't need Megabyte Bob to help them find their way around their directories.

Brian Millar
via the Internet

Furious or Spurious?

What's all the noise about the obscure Pentium division flaw? This "error" occurs once in every 100,000 divides and affects the accuracy only in the ninth decimal place or something. Scientists and statisticians who are raving about corrupted data should take a course in numerical analysis. Every calculation has an inherent rounding error. Computers can only represent decimals to a given accuracy due to the finite number of bits used to represent these numbers. These rounding errors compound with each subsequent calculation, making the end result accurate to an even smaller number of decimal places. Most of us will never need calculations that are accurate to the ninth decimal. Intel was not hiding the problem. They simply corrected it in new production just like the entire computer industry has done since its inception.

Toby Aulman
via CompuServe

Does Not Compute

Having purchased a Pentium system in December, I was curious as to whether my chip was flawed or not. I tried the equation you provided ("Pentium Happens," March, page 40), and received the answer for flawed chips. So I called Intel, and they said this was invalid because it did not incorporate floating-point computations. They gave me a new equation that can be computed in Windows' Calculator, or in Microsoft Excel or Lotus 1-2-3 spreadsheets: (1/824633702441.0)*824633702441.0 = ?

If you receive the arcane answer 0.9999999962747, the chip is flawed and Intel will replace it. When I asked about what this flaw means to me, I was told the flaw occurs between the fourth and sixth decimal places and is a rounding problem (0.12345 would be displayed as 0.1235). I've had absolutely no problems with the performance, yet my chip is definitely flawed. Intel says—and I agree—that only someone who needs to do extremely exact calculations should be concerned. Now where did I put that equation for the odds of winning the lottery before I die?

Chris McDannold
Covington, Kentucky

BY ALL MEANS use Intel's equation instead of the one we supplied—but don't use the Windows Calculator to run it. That piece of software has its own rounding-error problems. For that matter, don't use it for anything requiring accuracy beyond *one* decimal place. **ML**

Face-to-Face with OS/2

Stop misleading your readers. In your article "Videoconferencing Is Virtual Face-to-Face" in the February issue (page 240), you claim that videoconferencing is a bit expensive at $5,000 dollars a pop for the capability to simultaneously send data, voice, and video. That's not the whole story. I just bought videoconferencing software with all the benefits of the products you stated and more for only $69 plus tax. It's called OS/2 Warp. IBM's operating system lets you exchange video, voice, and data—and gives you a 32-bit operating system to boot. Not bad, huh? Why not give credit where credit is due?

Brett Littrell
via the Internet

OS/2'S PERSON-TO-PERSON gives you data, voice, and video communications, but $69 buys you only the software, not the modems, ISDN lines, cards, cameras, and other necessities of videoconferencing. **JOC**

Sink the Clipper

I enjoyed Ed Bott's column "Risky Business" (November 1994, page 43). I especially agree with his comment, "The most frightening risk of all is the full-court press on privacy that computers make not just possible but inevitable." The Clipper Chip is one such threat. We all need to work together to stop this chip from being misused. Yes, we need encryption on the Internet. But we don't need Big Brother or Big Sister (or Uncle Sam, for that matter) looking over our shoulders. Encryption should be used for safe business transactions on the Internet—for encrypting credit card numbers or other private data—not for government interference.

Loren Mikola
via CompuServe

LET'S NOT STOP with safe business transactions. Shouldn't we also have the right to secure personal

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transactions—everything from love letters to medical records? In a world that truly respects the right to privacy, shouldn't the distinction be completely academic? **EB**

Greedy ROM

More CD-ROM reviews! There are hundreds of titles on the market, with dozens of new ones arriving every week. Ron White has done an excellent job of covering the latest discs; I especially appreciate the street prices. But with so many titles out there, a few reviews every month isn't enough. Give us more CD-ROM write-ups along the lines of White's wonderful "Best CDs for the Job" (November 1994, page 156).

JON LIU
PLANO, TEXAS

THE ENORMOUS FLOOD of CD-ROMs means that I should be writing about more of them—and I should be paid more, too. But it also means that CD-ROMs are fast replacing floppies as the way to distribute software. So you'll be seeing more CD-ROM coverage throughout all our reviews and features. **RW**

Common Man's Hero

Three cheers for John C. Dvorak! Software licensing ("License to Kill," March, page 49) is another vehicle for lawyers to free the guilty and jail the innocent for their own profit. It also demonstrates how they can use the law to create "big brothers" who tell us how to run our personal lives. I hope Mr. Dvorak didn't sign on to some corporate lawyers' organization's "hit list" with this article. He sure shows a lot of courage to speak out for the common man.

TOM TITLOW
VIA AMERICA ONLINE

The Lotus Position

Your review of Lotus Organizer 2.0 ("Lotus Gets It Together—Simply," February, page 118) states that "the program still lacks database sorting and searching features." Actually, these features are available by simply pulling down menus from the Windows toolbar. Users can also assign categories to any Organizer entry, which facilitates more sophisticated sorting.

BARBARA BAIRD
LOTUS DEVELOPMENT CORP.

YOU'RE RIGHT, Organizer 2.0 does allow text string searches wherever they appear in the database, and you can categorize across all sections. But Boolean and/or searches are still on our wish list. **RS**

All a Bott Windows 95

I know you're taking a lot of heat about "overcoverage" of Windows 95. Please keep it up. This new upgrade will change PCs totally for the next few years. And to all of you DOS addicts: I'm willing to bet that after Win 95, DOS will have a maximum of two years of life left in it. Thank you. More Ed Bott!

WILLIAM D. GREER
VIA COMPUSERVE

Online Urban Favoritism

CompuServe, Prodigy, AOL, Internet . . . Too bad we folks out in the sticks have to pay long-distance charges to access the same services townies get for a local call. When are these big-shot BBSs going to wake up and start offering 800 numbers like any other business? There are a lot of us out here. Give us a break, guys.

LEROY MUNGER
BEMIDJI, MINNESOTA

TIME WILL TELL. While commercial services are expanding local access numbers every month, it's a slow process. Try contacting NetCom at (800) 501-8649. They offer an 800 number for eight cents per minute. **RS**

The Road to Higher Learning

Thanks for the road map to the World Wide Web that came with the March 1995 issue! As a brand new Internet surfer, I have been utterly dumbfounded by the wealth of information that is available—and by my inability to find sites quickly and easily. Your road map just made my Internet life much simpler.

TERI SHEETS
VIA NETCOM

YOU THINK that's cool? The road map is now online—hotlinks and all. Check it out on our very own *PC Computing* web page, at the following address: http://www.pc-computing.ziff.com/~pccomp. **JOC**

True Torture Stories

I thoroughly enjoyed your portable computer torture tests ("Notebook Hell," January, page 124). As a road warrior with many years of experience in laptop and notebook computing, I can relate some real-life experiences. The ultimate test for my first laptop—a Leading Edge system—that resulted in its untimely demise came at the hands (and feet) of my five-year-old son, Zachary. Zach managed to run between the laptop and power pack, and tripped. This launched the laptop off the table, and for a moment my little 16MHz 386SX could really fly. Zach recovered, but the machine did not.

GREGORY M. SMITH
MOUNTAIN TOP, PENNSYLVANIA

For the Record

- In the March SureTrak Project Manager for Windows review ("On Time and under Budget," page 80), the street price is $299 with more than 40 preconfigured reports.
- In February's "I-Way" piece entitled "Uncle Sam Is Wired" (page 327), the correct Internet home page for the National Technical Information Service (NTIS) FedWorld is http://www.fedworld.gov.

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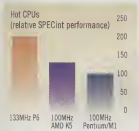
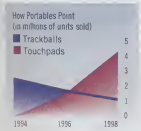


SOURCES: CHIP MAKERS, INDUSTRY INSIDERS

Whoever Inside: The market is filling up fast with fifth-generation processors capable of running high-bandwidth multimedia applications.



SOURCE: BIS STRATEGIC DECISIONS

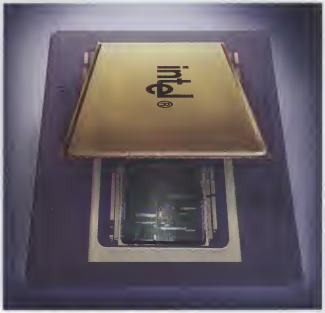
Tap and Click: The pointing device of choice on portables? Touchpads like those on Apple's newer PowerBooks will be on 70 percent of all portables by 1998.

SOURCE: COLEMAN & ASSOCIATES

Work Hard, Play Hard: Approximately 44 percent of Americans play games on their PCs, and nearly 25 percent of those people played their last PC game at work.

PREVIEW

Inside the Intel P6



Under the Hood: Intel's P6 will be twice as fast as today's Pentiums and a generation ahead of AMD and Cyrix CPUs.

You're probably accustomed to thinking of your PC's processor the way you do the engine in your car, but the latest generation of CPUs works more like small information factories.

It's not just a fanciful distinction. The days when microprocessors drove straight ahead, completing one instruction at a time, are long gone. Intel's P6—the successor to the Pentium—and Pentium clones from AMD, Cyrix, and NexGen are designed to deal with multiple assembly lines of data coming in from memory, the video adapter, the hard drive, the CD-ROM drive, and other high-load peripherals all at once.

And no one is pushing this rush to faster chips harder than Intel. The horsepower needed by image processing, speech recognition, videoconferencing, and other resource-taxing applications has to come from somewhere. Intel figures better the CPU than, say, a companion DSP made by Motorola or Texas Instruments. Intel's newest chips, including the recently released 120MHz Pentium (see "Tomorrow's PCs? 120MHz and Loaded," page 62), have also been subsuming tasks traditionally performed by components such as sound cards, DSP boards, and graphics controllers.

Intel's P6, however, brings yet more engineering and design wizardry to the table, including multiple branch prediction, data flow analysis, and speculative execution—processes so complex that even if you knew how they worked, you still wouldn't know for sure. In conjunction with a new on-chip cache, dynamic execution means that the P6 is likely to be twice as fast as current Pentiums and a generation ahead of the clones (see top graph at left). In fact, Intel's new information factory runs at about 90 percent of capacity, compared to the Pentium's 60 percent.

NexGen's Nx586 Pentium clone is the chip that comes closest to the P6's sophistication. It still lacks an on-chip

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HP's Fifth-Generation LaserJet, 6X CD-ROM Arrives

math coprocessor and can execute only one instruction to the P6's three. But Linley Gwennap, editor of *Microprocessor Report,* figures that NexGen should be able to demo a P6 clone at Comdex/Fall, which is when Intel will start shipping P6-based systems in quantity.

By then, AMD and Cyrix should have Pentium clones ready to go as well. Gwennap believes AMD can add an on-chip L2 cache and processor-speed cache bus to its K5 to create a P6 clone sometime in 1996. Cyrix, however, has a larger design challenge and is already behind schedule on the M1 Pentium clone.

The bottom line? Intel is likely to stay a generation ahead into 1996, but the competition is closing in fast. **MH**

CD-ROM Times Six Plextor has announced the industry's first sextuple-speed or 6X CD-ROM drive. The 6Plex PX-63CS drive will hit throughput speeds of 900Kbps and access times of 250ms. Also onboard: a 256K buffer and controls for playing audio CDs. The drive should be available by summer with street prices starting at under $550. In the meantime, look for quad-speed drives to drop to under $200 by then. **BM**

Point and Print Want to put the infrared port on your sporty new notebook to work? Point it at Hewlett-Packard's new laser printers and print away. Dubbed the LaserJet 5P and LaserJet 5MP, HP's newest personal printers offer 6-ppm output speeds and 600-by-600-dpi output—all at street prices of $860 for the LaserJet 5P and $1,000 for the PostScript-ready LaserJet 5MP. Both should be available this summer. **KC**

The Next Best Thing to E-Cash

The **Quicken Visa Gold** card does other credit cards one better: It tracks your credit card account **electronically** via a **toll-free dial-up** or monthly floppy-disk mailing. For your savings, Intuit's **Your Mutual Fund Selector** CD helps you choose from 1,000 popular funds rated by **Morningstar.** **MH**

Quicken Visa Gold / Intuit / (800) 242-9409 / Interest rates vary, no annual fee / *Reader Service No. 605*
Your Mutual Fund Selector / Intuit / (800) 624-6930 / $40 est. street price / *Reader Service No. 606*

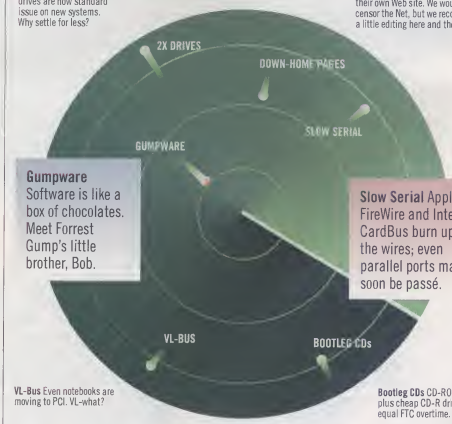
4X CD-ROM Drives

With 6X CD-ROM drives on the horizon, quad-speed drives are now the sweet spot in the market. Prices are as of February 22, 1995.

Product	Price
Mitsumi FX400 *ComputAbility* *(800) 334-9950*	$209
Teac SuperQuad 4X *Bulldog Computer Products* *(800) 438-6039*	$289
Plextor 4Plex *Midland ComputerMart* *(800) 407-6700*	$319
NEC MultiSpin 4Xi *A Matter of Fax* *(800) 433-3329*	$363

Reader Service Numbers: ComputAbility *607;* Bulldog Computer Products *608;* Midland ComputerMart *610;* A Matter of Fax *611*

RADAR WEIGHING THE **SOCIAL INTERFACE,** EDITING THE NET



2X Drives Quad-speed CD drives are now standard issue on new systems. Why settle for less?

Down-Home Pages Everyone's got their own Web site. We wouldn't censor the Net, but we recommend a little editing here and there.

Gumpware Software is like a box of chocolates. Meet Forrest Gump's little brother, Bob.

Slow Serial Apple's FireWire and Intel's CardBus burn up the wires; even parallel ports may soon be passé.

VL-Bus Even notebooks are moving to PCI. VL-what?

Bootleg CDs CD-ROMs plus cheap CD-R drives equal FTC overtime.

What's on the Scope? If a blip is near or moving toward the middle of the radar screen, check it out. If it's moving off the screen, steer clear for now.

Surrounded By Sound

Still using those tinny speakers that came with your multimedia upgrade kit? Bose, the company that brought growling woofers to PCs with its high-end Acoustimass Multimedia Speaker System, now offers a pair of speakers *without* a subwoofer. The 2.5-inch MediaMate Speakers deliver surprisingly deep sounds and are easier to place in a crowded office. They also provide controls to mix signals from different sources.

Altec Lansing is getting into surround-sound for PCs with its ACS500 system. It has an 18-watt subwoofer that you can place anywhere in a room and two towering tweeters. Each tweeter enclosure contains four speakers, two of which are angled so sound is reflected by walls to create more ambiance.

If you've already got a decent set of speakers but want to add 3-D resonance, pick up NuReality's Vivid 3D Pro. This small device fits between your PC and speakers, and creates a richer sound with more stereo separation. We heard the difference with our own ears, and it's amazing. **RW**

MediaMate Speakers / Bose / (800) 444-2673 / $399 est. street price / *Reader Service No. 612*
Altec Lansing ACS500 / Altec Lansing / (800) 648-6663, (717) 296-2818 / $399 est. street price / *Reader Service No. 613*
Vivid 3D Pro / NuReality / (800) 501-8086 / $139 est. street price / *Reader Service No. 614*

Picture This in Your Documents

What's the easiest way to **drop photos** into letters, reports, and other documents? EasyPhoto, no contest. This $49 utility uses a **film-strip metaphor** for placing photos in any Windows document. The software comes on a CD with **hundreds of images,** or you can bring in your own snapshots with the $249 **EasyPhoto Reader,** a compact serial scanner for reading 4-by-6-inch prints. Double-clicking on images brings up EasyPhoto's hassle-free **in-place editing tools.** For a full **demo,** visit Storm Software's Web page: http://www.stormsoft.com/storm/. **WT**

EasyPhoto and **EasyPhoto Reader** / Storm Software / (800) 275-5734 / $49 and $249 est. street prices, respectively / *Reader Service No. 615*

LOTUS NOTES 4.0 PREVIEW

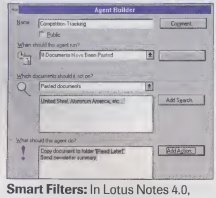
Smart Agents and a Web Browser

Lotus Notes is the software that people love to hate. They complain about its quirky interface, high price, Byzantine development environment, and massive support burden. But despite those objections, big business bought 1.3 million copies in 1994, and Lotus President Jim Manzi predicts that the Notes installed base will reach 20 million by 1997. Wildly optimistic? Maybe not, if the next version lives up to its advance billing.

Last January the wraps came off Lotus Notes Release 4.0. While it remains a hard-to-describe distributed database with powerful communications, replication, and security layers, Notes 4.0 is expected to be faster and smarter. The real news, though, is the new interface, designed to swat down those pesky objections.

The clunky mail interface is gone. Notes 4.0 gets the slick cc:Mail interface with tree, list, and viewer windows, plus usability improvements like drag-and-drop folders and one-button addressing. In addition, point-and-click agents prioritize mail and delegate messages while you're away.

There's a big focus on making life easier for mobile users too. Replication is simpler because you can predefine settings for multiple locations. You can also replicate databases on different servers in a single phone call or use the Internet as your wide-area network. And for trolling the Net, you can use the Mosaic-style Web browser that's built in to Notes 4.0.



Smart Filters: In Lotus Notes 4.0, macros are replaced by point-and-click agents that prioritize your mail.

Want to build your own Notes application? Instead of cryptic macros, Notes 4.0 lets you choose simple actions from a drop-down list, or you can build requests in the Basic-like LotusScript language. Its viewer looks more modern and hierarchical, with rich text, collapsible section headings, and multiple subject lines. And OLE 2 support means that you can replace the Notes editor with Microsoft Word or Ami Pro.

A preview edition is due this summer for longtime Notes users, while the official release probably won't arrive until sometime this fall. It doesn't hurt that Microsoft's Notes-killing Exchange Server has been stalled in development for ages. Those delays give Lotus plenty of time to convince you that the new Notes is a lovable character after all. **EB**

Lotus Notes Release 4.0 / Lotus Development / (800) 426-7682 / Price not yet determined / *Reader Service No. 616*

Contributors to Pulse: ED BOTT, MIKE HOGAN, RON WHITE, JAMES OLIVER CURY, KYLA K. CARLSON, MATTHEW LAKE, BEN MILLER. *Edited by* WENDY TAYLOR.

PHOTOGRAPH BY ARNOLD TOSE JR.

OUR DAY IN HELL BEGAN WITH A HOT CUP OF COFFEE,

AND ENDED WITH A TOAST.

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Torture Test

Here's to our indestructible Dell® Latitude XP.™ Back from *PC Computing's* Notebook Hell and winner of the Best Overall Award in their Annual Notebook Torture Test.

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In fact, the Dell Latitude XP was the only notebook to receive five stars. As the magazine remarked, "the Latitude XP braved our durability tests with nary a scratch – surviving in better shape than any notebook we tested." Then they pronounced it "the best traveling six-pound machine you'll find."

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intel inside

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Dell's featured computer artist is Jonathan Herbert of NY, NY.

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Bug Bytes Quick Fixes to Software Glitches and Hardware Gotchas, by Doug Vargas

A Shocking Problem for ThinkPads

ThinkPad owners, listen up! IBM is recalling some ThinkPad power adapters. Certain models of the adapter can zap unsuspecting owners of the ThinkPad 360C, 755C, 755CE, or 755CD.

Fix: The defective adapters are easy to spot. Check the label on the adapter—if the model number is AA19210 and the date code is 9452 or lower, contact IBM at (800) 238-1967 for a replacement.

Sidekick Gives Schedules the Boot It's an old scold: Save early and often. Unfortunately, users of Borland's Sidekick for Windows PIM Version 1.x discovered the hard way that if they save Calendar entries at the same time that the Auto Save feature kicks in, the Calendar file gets corrupted. The result is missing entries and random garbage characters in the file.

Fix: Disable the Auto Save feature by unchecking the Auto Save box on the Calendar's Daily Setup screen.

Intuit's Tax Software Needs an Audit On March 2, Intuit announced that calculation errors had been discovered in TurboTax for Windows, TurboTax Multimedia for Windows, and MacInTax. All three programs are prone to miscalculations if you claim disability income, take a Section 179 automobile deduction, use the Estimated Tax Worksheet to forecast 1995 tax year payments, or depreciate an asset in the final year of its depreciable life.

Fix: Intuit has since corrected the calculation error. Call (800) 224-0948 to order replacement disks, or download the updates from Intuit's support BBS at (602) 295-3261. The update files are more than 5MB, so don't try this with a sissy modem. Intuit President Scott Cook estimates that fewer than 1 percent of the company's customers were affected by the problem—small consolation when you consider that even minor mistakes can wake sleeping IRS dogs.

Debugging PerfectOffice Users of PerfectOffice 3.0 for Windows got a little surprise when the clock struck 12:01 on the first day of this year. On January 1, 1995, folks trying to launch several of the suite's applications received the following message: "Debug Error—Old Theta Being Updated." The individual applications work fine, but the message pops up every time one of them is launched.

Fix: Change the date on your system clock to December 1, 1994, and run the applications. Then quit the applications and reset your clock to the correct date. The error message should vanish. For more details, contact Novell at (800) 861-2085.

Excel Takes a Swig of Miracle-Gro It's a good thing data files don't mutate like the things in the back of your refrigerator, right? Well, a number of Excel 5.0 for Windows users have found that the text in some spreadsheet cells mysteriously grows to a much larger size, changes colors, and even acquires an underline. What causes this odd behavior? Opening a document that's zoomed to a size other than 100 percent, then printing it immediately. Even stranger, the alterations appear only onscreen; the document still prints correctly.

Fix: To correct this problem in a particular spreadsheet, close and reopen the document. Now scroll around the entire spreadsheet before printing. To avoid the problem altogether, save all Excel documents with the view set to 100 percent.

Hijacked by HiJaak Early adopters of Inset Systems' indispensable new HiJaak Graphics Suite may be hijacked by the error message "Can't find LTEXPAND.DLL" when they try to load the software from the CD-ROM onto their hard drives. The error causes no other problems, but it won't let HiJaak load.

Fix: Inset has already updated the CD to correct the problem. If you run into this snag on the way to graphics heaven, contact Inset at (203) 740-2400 for a replacement copy of the suite.

FedEx Ships an Overnight Surprise Federal Express dazzled its customers during the Super Bowl this year by announcing the arrival of FedEx Ship, a new Windows program that lets customers arrange for pickups, print shipping labels, and keep records of deliveries. Well, it's supposed to keep records of deliveries. Some FedEx Ship users have received a "Database Corrupted" error message and discovered that records of their past shipments were gone. Turns out the initial version of the program will delete all previous entries on the first of each month.

Fix: According to Federal Express, only disks sent out in January had this problem. When users of this version log on to the FedEx server, their software is automatically updated. For more information, contact Federal Express's technical support at (800) 370-0539.

Photoshop's Mousetrap Whether you're touching up photos for a national ad campaign or you just feel like pasting a cow's head onto the body of your cousin Herb, Photoshop 3.0 for Windows is the top choice of pros and psychos. But Photoshop isn't too fond of Microsoft's newest mouse driver (Version 9.01). Run the program with this driver installed and Photoshop may crash, or you may end up with a dead mouse. Fortunately, the mouse returns to life once you restart Windows.

Fix: Go into Windows Setup and select the standard Microsoft or IBM PS/2 mouse driver before loading Photoshop. The problem should then vanish.

DeskJets Need a Grip Between June 1993 and March 1994 Hewlett-Packard used a type of rubber for some printer rollers that loses its "grab" over time. Models with these rollers have trouble pulling blank paper from their trays, and you may receive "Out of Paper" error messages even when the paper tray is stocked. The affected models are the DeskJet/DeskWriter 520 and the DeskJet 550C and 560C printers with serial numbers between US36000000 and US43Hxxxxx (where each *x* can be any letter or number). Units with serial numbers of ES41711001 through ES45112001 may also lose their grip.

Fix: HP will send customers who report this problem the HP Paper Feed Cleaning Kit free of charge. For more information, contact HP support at (800) 656-2324.

Want More?

Get weekly bug updates from our Web page or our CompuServe forum (see page 298 for details on how to log on). Got a bug to report? Drop Doug Vargas a line on CompuServe at 72241,2367 or via the Internet at 72241.2367@compuserve.com.

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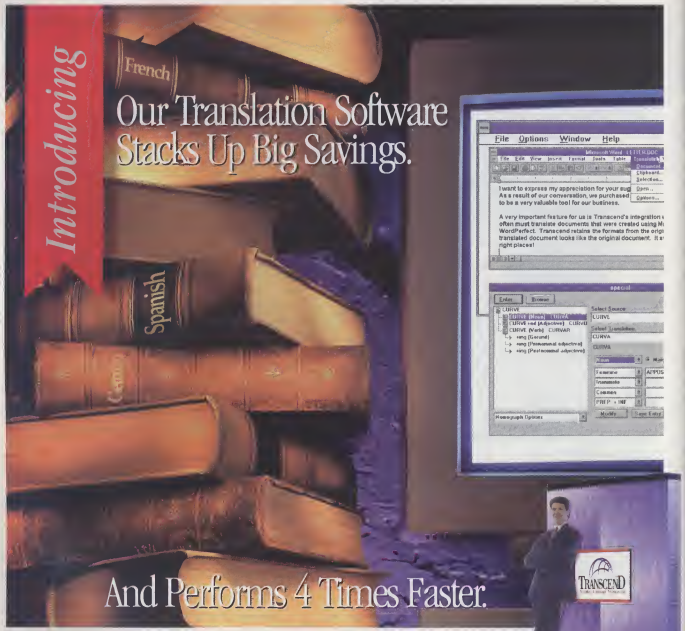

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The A-List

Editors' Top Picks by Wendy Taylor

		Top Pick	The Buzz	The Stats	Issue Reviewed
Systems	High-Performance Pentium PC	Gateway P5-120	**A rocket disguised as a PC. EDO memory gives this 120MHz Pentium its edge.**	$4,199, 120MHz Pentium, 16M8 RAM, 1.62GB hard drive.	See page 62. Reader Service No. 651
Systems	Pricewise Desktop PC	Polywell Poly 590P3	**120MHz Pentiums are here, and P6s are in the wings; 90MHz systems hit the sweet spot.**	$3,180, 90MHz Pentium, 16M8 RAM, 540M8 hard drive.	See February, page 136. Reader Service No. 652
Portables	[illegible]	Toshiba Satellite T1250CD	**The award-winning Portégé design finally migrates to the Satellite line—CD-ROM drive in tow.**	$4,899, 75MHz 486DX4, 8M8 RAM, 500M8 hard drive.	See April, page 58 Reader Service No. 653
Portables	[illegible]	IBM ThinkPad 701C	**Better than George Jetson's car—the full-sized "butterfly" keyboard fans out when you open the case.**	$5,149, 50MHz 486DX2, 8M8 RAM, 510M8 hard drive.	See March, page 56. Reader Service No. 654
Portables	[illegible]	Dell Latitude XP 4100CX	**Survived our annual torture tests and our Usability Labs. And how about that 4.5-hour battery life?**	$2,299 to $4,199, 100MHz DX4.	See January, page 124. Reader Service No. 655
Printers	Desktop Laser	HP LaserJet 5P	**It's small, affordable, and prints brilliantly. Plus, who needs cables? You can beam jobs to the infrared port.**	$850, 6 ppm, 600 dpi, PCL5 (PostScript optional), infrared port.	See page 37. Reader Service No. 656
Printers	Network Laser	HP LaserJet 4Si MX	**Pages sail out so fast that you won't even mind sharing it.**	$4,249, 17 ppm, 600 dpi, PCL5, PostScript Level 2.	See December 1994, page 134. Reader Service No 657
Printers	Portable Printer	Citizen PN60	**Less ballast in your briefcase than an umbrella, and the pages look great too.**	$365, 300-dpi thermal fusion, 2.25 pounds, 2 ppm.	See February, Page 64 Reader Service No. 658
Printers	Personal Color Printer	Epson Stylus Color	**Knock-your-socks-off color that could pass for laser—at a fraction of the cost.**	$529, 720 by 720 dpi, ink jet.	See October 1994, page 58. Reader Service No. 659
Video	Monitor	Nanao FlexScan T2·20	**One look and there's no going back. Besides, it pays for itself in just a few months in improved usability.**	$1,041 to $1,339 (17 inch), $1,990 (20 inch).	See January, page 88. Reader Service No. 660
Video	Graphics Accelerator	Matrox MGA Impression Lite	**The 128-bit Imagine from Number Nine is faster, but we'll take the Impression for its 3-D features.**	$299, 2M8 VRAM, 1,280 by 1,024 at 76Hz, PCI interface.	See February, page 70. Reader Service No. 661
Storage	High-Capacity Hard Drive	Western Digital Caviar AC 31600	**Be greedy. At under 37 cents per megabyte, why not get two?**	$600, 1.62G8, enhanced IDE, 9ms.	See page 62. Reader Service No. 662
Storage	CD-ROM Drive	NEC MultiSpin 4Xe	**The fastest quad-speed around. Look for prices to drop into the $200 range as 6X drives arrive.**	$415 internal, $515 external, plus $80 for interface kit.	See March, page 74. Reader Service No. 663
Peripherals	[illegible]	Canon IX-4015	**Throw the paper onto the glass, press the Autoscan button, and you're done.**	$849, 400 by 800 dpi, 24-bit color, Ofoto software.	See December 1994, page 152. Reader Service No. 664
Peripherals	[illegible]	Sound Blaster Awe 32	**Sound so real it will make your teeth shake. Works with anything from Windows to Doom.**	$299, wavetable synthesis, 16-bit programmable DSP.	See December 1994, page 148 Reader Service No. 665
Peripherals	[illegible]	U.S. Robotics Courier V.Everything	**Connects to everything but alien spacestations at 28.8Kbps.**	$399, V.32, V.32terbo, V.34, V.Fast Class, flash ROM upgradable.	See December 1994, page 154. Reader Service No. 666

The A-List Editors' Top Picks by Wendy Taylor

		Top Pick	The Buzz	The Stats	Issue Reviewed
Desktop Apps	Software Suite	WordPerfect PerfectOffice 3.0	**Runs nose to nose with Microsoft Office, but the cross-application integration is better.**	$659, 25MHz 386 or faster, 8MB RAM, 40MB hard drive.	See November 1994, page 85 Reader Service No. 667
	Word Processor	WordPerfect 6.1	**More features and you might get hurt.**	$249, 386 or faster, 6MB to 8MB RAM, 28MB hard drive.	See December 1994, page 160. Reader Service No. 668
	Spreadsheet	Microsoft Excel 5.0	**You won't go wrong with Quattro Pro or 1-2-3 for Windows, but usability extras make Excel our top pick.**	$320, 386 or faster, Windows 3.1, 4MB RAM, 20MB hard disk.	See December 1994, page 168. Reader Service No. 669
	Database	Lotus Approach 3.0	**Throw anything in it, any way you like—no programming required. Usability approved.**	$329, 386 or faster, 4MB RAM, 8.5MB hard disk.	See March, page 146. Reader Service No. 670
Graphics	Presentation Graphics	Microsoft PowerPoint 4.0	**Makes you feel like a pro every time you use it, even if you load it only a few times a year.**	$300, 386 or faster, 4MB RAM (8MB recommended).	See December 1994, page 178. Reader Service No. 671
	Personal Desktop Publisher	Microsoft Publisher 2.0	**The usability champ; turns any PC into a vanity press.**	$89, 386 or faster, Windows 3.1, 4MB RAM, 3MB hard disk.	See December 1994, page 163. Reader Service No. 672
	Professional Desktop Publisher	QuarkXPress 3.3 for Windows	**Industrial-strength page layout and design with tight typography and color control.**	$570, 486 or faster, 8MB RAM, 15MB hard disk.	See December 1994, page 163. Reader Service No. 673
	Business Graphics	Shapeware Visio 3.0	**Click, drag, done.**	$125, 386 or faster, Windows 3.1, 4MB RAM.	See December 1994, page 205. Reader Service No. 674
	Drawing and Illustration	CorelDraw 5	**Draw, edit, print, and present with this all-in-one graphics tool kit.**	$500, Windows 3.1, 4MB RAM, CD-ROM drive.	See December 1994, page 205. Reader Service No. 675
Finance	Personal Finance	Intuit Quicken 4 Deluxe for Windows	**Find out what that cup of coffee and muffin every morning is costing you over the long haul.**	$60; 386 or faster, 4MB RAM, 7MB hard disk.	See April, page 186. Reader Service 676
	Business Accounting	Peachtree Accounting 3.0 for Windows	**The least offensive CPA we've ever met. Coming soon: a CD edition with a Web browser.**	$139, 386 or faster, 4MB RAM, 7MB hard disk.	See October 1994, page 88. Reader Service No. 677
Communications	[illegible]	Delrina Communications Suite 2.1	**One-button fax and modem control—WinFax Pro 4.0, WinComm Pro, and great i-Way support.**	$109, 486 or faster, 4MB RAM, 10.5MB hard disk.	See January, page 126. Reader Service 678
	[illegible]	Netscape Navigator	**What are you waiting for? Download a copy from ftp.mcom.com.**	Free ($39 commercial version), Windows 3.1, 4MB RAM.	See April, page 52. Reader Service No. 679
Organization Tools	Project Manager	Primavera Systems SureTrak Project Manager	**Take charge. Keep your projects on time and under budget.**	$299, 386 or faster, Windows 3.1, 4MB RAM, 11MB hard disk.	See March, page 80. Reader Service No. 680
	Personal Information Manager	Lotus Organizer 2.0	**Not just for people who iron their underwear.**	$119, 386 or faster, Windows 3.1, 8MB hard disk.	See February, page 118 Reader Service No.681
	System Utility	Vertisoft Systems Remove-It	**Take back your hard drive. Reclaim megabytes from disk-hogging fonts, orphan DLLs, and other file flotsam.**	$39, 386 or faster, 2MB RAM, 2MB hard disk.	See March, page 84. Reader Service No. 682
	Reference	Microsoft Bookshelf 1995	**"There is no distinctly native American criminal class except Congress." Who said it? Look it up.**	$79, 386 or faster, Windows 3.1, CD-ROM drive, 30MB hard disk.	See December 1994, page 206 Reader Service No. 683

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	MICROSCAN™ 3V	MICROSCAN 4V
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Video/H-sync Bandwidth:	30-50kHz	30-64kHz
Front Panel Controls:	Digital	Digital

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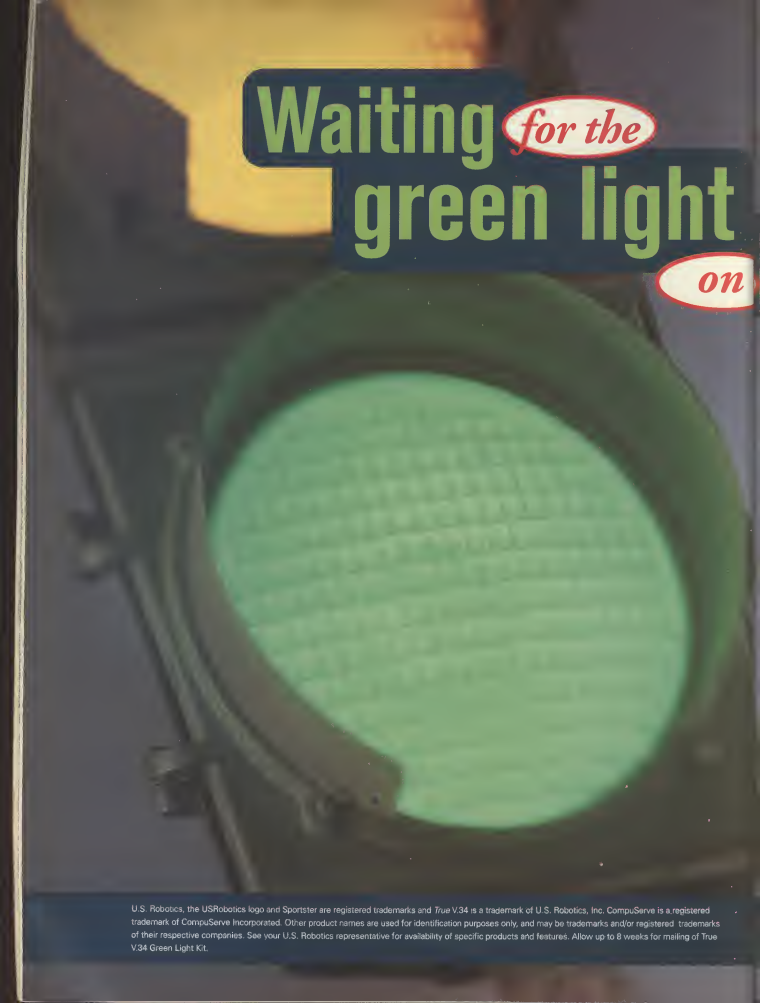
Circle 173 on reader service card.



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V.34?

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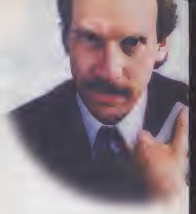
Circle 141 on reader service card.

Paul Somerson



Spork You

Dust off your BarcaLoungers. And settle in for the truly bizarre trial of the decade. Nah, we're not talking O.J., or the Long Island Railroad shooter, or the juicy Clinton escapades, or the mom who drowned her kids, or the kids who shotgunned their mom. The *real* circus trial is about to begin, with every **WHINER AND ANKLE-BITER** in the PC business hoping to nail Microsoft. And brother, it's pile-on time.

The main event is Judge Stanley Sporkin's recent decision to trash the Justice Department's antitrust consent agreement with Microsoft. What's his message? Big is bad. Punish success. Punish savvy management. Punish brilliant marketing. Sounds like the judge may have a severe case of **PUNISH ENVY.** Microsoft's domination of the PC industry will someday be studied in business schools. And if Sporkin has his way, law schools.

Sporkin even sniffed that it wasn't enough just to pillory Microsoft, which would "do little or nothing to address the unfair advantage it has already gained." What's next? **AFFIRMATIVE ACTION** for second-rate computer companies?

On one hand, the feds grumble that we're failing to create the right kinds of forward-looking companies that will stoke the economy, create jobs, bolster exports, and keep us on top of the high-tech global heap. Companies like . . . well, Microsoft. On the other hand, they're trying to **KNEECAP** the ones that win.

What's gotten the judge so hot and bothered? Here it is: Microsoft made vendors buy copies of DOS and Windows for every system they sold. It announced products before they were ready. It supposedly used undocumented calls. Horrors! The fiends!

Reality check: Microsoft already agreed to stop forcing vendors to buy extra OS copies. OK, it's guilty of vaporware. So is half the industry. And the flap over undocumented calls is ludicrous—if that were true, Microsoft's products would be vastly better than those from its competitors. They're good, but not that good.

Nobody's going to cry for Microsoft. Most competitors enjoy seeing the company squirm. But trashing Microsoft won't fix anything. And the truth is that Microsoft's size can **MAKE THINGS HAPPEN.** For instance, teaming up with Intuit will be a massive shot in the arm for electronic commerce.

Where will it end? Competitors have nothing to lose, and hope to become the next Stac **JUDICIAL LOTTERY WINNER.** Bad plan.

Wake up. There's a simple way to slow the Redmond Juggernaut: Produce better products. This isn't impossible. Microsoft sells great apps, but Novell's DAD whomps Microsoft's MOM hands-down, and its built-in file-handling puts Microsoft programs to shame. Lotus's Approach crushes Access in usability testing. And Microsoft is really nowhere when it comes to areas like networking or scheduling. Don't try to beat Microsoft in court. Beat them in the market.

PHOTOGRAPH BY JAMES McGOON

The ZEOS® Pantera™... Leaps Ahead Of The Rest.

Month after month, the ZEOS Pantera outranks all others in performance, reliability and value. Unparalleled in its field, the Pantera has earned award after award—review after review from leading experts at top industry publications. It's the biggest bang for your buck.

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The Pantera, based on Intel's 486, DX4 and Pentium processors all the way to 120MHz, is breaking record after record with its blazing performance and awesome power.

intel inside

In their December 1994 Pentium and 486 roundup, *PC Magazine* gave top honors to the ZEOS Pantera: "Few product lines fared as well in our price/performance index as the ZEOS Pantera family. A major factor in the Pantera units' success was the outstanding Winstone 95 scores: The Pentium machines produced first-place scores in their respective tiers, and the ZEOS 486DX2-66 earned a top-five ranking among the entry-level systems."

PC World agrees: "Mark a new high on the performance chart!" They said the Pentium-66 and Pentium-90 processor-based Pantera PCs were "the fastest system(s) ever tested."

What makes the Pantera the top performer—time after time? Superior engineering—starting with a ZEOS designed motherboard created specifically to take full advantage of the latest technological advancements. The motherboard is loaded with exceptional features such as an on-board PCI Local Bus Enhanced IDE Controller and support for up to four IDE devices. And for the fastest video performance, the Pantera includes a 64-bit Diamond Stealth PCI video card standard.

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yes It runs with NetWare

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PC MAGAZINE EDITORS' CHOICE
Pentium-66 April 12, 1994
DX4-100 June 28, 1994

COMPUTER SHOPPER
Pentium-60 April 1994
Pentium-60 August 1994

PC WORLD
486DX2-66 January 1994 February 1994 March 1994 April 1994 December 1994 January 1995 February 1995 March 1995 April 1995
DX4-100 October 1994 November 1994 December 1994
Pentium-60 December 1994 January 1995 February 1995 March 1995 April 1995
Pentium-66 June 1994 July 1994 August 1994 September 1994
Pentium-90 August 1994 September 1994 October 1994 November 1994 January 1995 February 1995

PC Best
Pentium-66 May 1994
Pentium-90 February 1995

Windows EXPERTS' PICK
Pentium-66 June 1994
Pentium-60 August 1994

BYTE MAGAZINE'S WINTEL 100
Pentium-90 November 1994

W 100 BEST BUYS
486DX2-66 March 1994

Package 1		Package 2		Package 3	
486DX2-50	$1295	486DX2-50	$1595	486DX2-50	$2095
486DX2-66	$1345	486DX2-66	CN! $1645	486DX2-66	CN! $2145
DX4-100	$1545	DX4-100	$1845	DX4-100	CN! $2345
Pentium-60	$1645	Pentium-60	CN! $1945	Pentium-60	$2445
Pentium-75	$1695	Pentium-75	CN! $1995	Pentium-75	CN! $2495
Pentium-90	$1995	Pentium-90	$2295	Pentium-90	CN! $2795
Pentium-100	$2195	Pentium-100	$2495	Pentium-100	$2995
Pentium-120	$2595	Pentium-120	$2895	Pentium-120	$3395

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- 340MB local bus IDE hard drive with 120K cache
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- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11

- 8MB RAM
- 528MB local bus IDE hard drive with 120K cache
- **4X CD-ROM** drive and 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- ZEOS 14" 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
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- 16MB RAM
- **850MB** local bus IDE hard drive with 256K cache
- **4X CD-ROM** drive and 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
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- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11
- **Lotus SmartSuite**

Hottest:

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- 1GB local bus IDE hard drive with 256K cache
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- **10-bay vertical case**
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11
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- 16-bit stereo **sound card**
- **High power speakers** with separate subwoofer
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- On-board Fast SCSI-2 option.

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- 14" SVGA color monitor
- 6-bay desktop case
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Pentium-75 $2395
Top Gun:
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- 15" SVGA color monitor upgrade
- 14.4/14.4 send/receive fax modem
- Lotus SmartSuite

Pantera™

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Pentium-90 $2895
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- 528MB local bus IDE hard drive
- 4X CD-ROM drive, 3.5" 1.44MB FDD
- Diamond Stealth 64-bit PCI local bus graphics card with 2MB VRAM upgrade
- 15" SVGA color monitor
- 6-bay desktop case
- MS-DOS, Windows for Workgroups, Microsoft Mouse
- Lotus SmartSuite

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Pentium-90 $3095
Pentium-100 $3295
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Pentium-75 $3118
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Best MM:
- 16MB RAM, 256K SRAM cache
- 528MB local bus IDE hard drive
- 4X CD-ROM drive, 3.5" 1.44MB FDD
- 16-bit sound card, stereo speakers
- Diamond Stealth 64-bit PCI local bus graphics card with 2MB VRAM upgrade
- 17" SVGA color monitor
- 10-bay vertical case
- MS-DOS, Windows for Workgroups, Microsoft Mouse
- Lotus SmartSuite

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Pentium-90 $3795
Pentium-100 $3995
Best MM Supreme:
The above system modified to include:
- 24MB RAM
- 1GB local bus IDE hard drive
- High-power speakers with subwoofer

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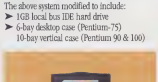
- 14" SVGA color monitor
- 6-bay desktop case
- MS-DOS, Windows for Workgroups, Microsoft Mouse



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- Custom carrying case
- Extra battery
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Circle 282 on reader service card.

John C. Dvorak

JUGGERNAUGHTY

It's all over except the shouting. Intel and Microsoft are on the verge of locking up the computer scene forever. Intel has preannounced the P6, a follow-up to the Pentium chip that looks so good it might eclipse the competition once and for all. And the timing looks perfect: The company says it will be available in systems by year-end. In its best version, the P6 appears to outperform IBM's PowerPC 620. Because IBM has been unable to deliver even the slow 601 PowerPC system, and Apple will be just rolling out the 604 PowerPC this year, Intel's move will seal the PowerPC's fate—except maybe for the Apple design. It may, in fact, sink Apple, too. There are no 620 systems in sight.

The situation proves the depressing economic thesis outlined in a February 1990 *Scientific American* article. In "Positive Feedback in the Economy," Stanford University Professor W. Brian Arthur describes the process through which companies quickly evolve into monopolies in a technological era. He replaces the concept of "diminishing returns" with "increasing returns," and adequately explains both the Microsoft and Intel situations without mentioning either company by name. Basically, you can say that Microsoft is in the driver's seat because once a company establishes leadership in market share, people are reluctant to try anything else. How many people would even think of playing with OS/2 Warp if it didn't run Windows apps?

There are lulls that present an opportunity for change, but these are short and ethereal. For instance, IBM's PowerPC machines might have made hay during the trauma over Intel's Pentium bugs. But now it's too late for the PowerPC to do much more than run the next-generation Mac. I think the developing situation may also kill Windows NT, a genuinely interesting piece of code. Most of it will be reincorporated into mainline Windows products, and also become a substitute for Xenix, the old Microsoft version of Unix, a niche operating system.

The pathetic aspect of all this is that there may be no practical way to reverse this trend, but it needs reversing to keep competition healthy. Microsoft is already showing wrinkles because nobody is competing with it. Windows 95 is taking forever. Word 6.0 is getting lots of flak. The company is losing focus, and there is no incentive for it to strive. Borland International seems dead in the water. Lotus Development is hung up on Notes and doing nothing with Ami Pro from what I can tell. From the looks of it, Novell will drop the WordPerfect ball and we can expect it to go the way of DisplayMate, MultiMate, Volkswriter, WordStar, and XyWrite, to name a few skeletal remains of a vibrant competitive market now dominated by Word. Worse, all the smaller companies with good products express a fear of Microsoft's ability to keep the competition off the store shelves.

Some **LAST-DITCH** *moves might reverse this* **PATHETIC** *trend, but it'll take a miracle to break up the* **MONOPOLY** *. . . And we need the* **MICROSOFT-INTEL** *monolith to stave off* **JAPAN.**

Intel, on the other hand, has had plenty of hot competition. Advanced Micro Devices, Cyrix, and even IBM have cloned Intel's products and attacked its markets. So Intel is on the verge of blowing the socks off everyone and, like the once-successful vendors who fought IBM for the mainframe business, the battered competition no longer poses all that much of a threat.

Interesting how the mainframe business began a slow downward slide once IBM was left alone at the top of the hill. The same will happen to Intel and Microsoft, but not for years. Intel's paranoia will drive it for a while to leapfrog and produce some super technology. But that will eventually come to an end when the company starts milking that last chip until the cow runs dry.

Microsoft will go stale sooner, but will rule the roost for many years to come.

None of this would have happened if IBM had capitalized on the PowerPC machines it's been sitting on for a year or more sans operating system. It would have been better if IBM had just shipped those machines to the market with no operating system. Then superhacks would have developed loaders and emulators in no time and we'd be using the machines as I write this. But . . . no. It's hard to say exactly who was responsible for this mess, but I'd guess the PC division. Who else?

There are still some last-ditch moves that might save the day, but I'm not counting on a miracle. The government ought to come in and bust up both Microsoft and Intel, but the two companies merging into one unstoppable megalith is more likely with sorry apologists like the Janet Renos of the world running things. And we have to face the realities of the global economy in which a Microsoft-Intel combine is needed to stave off the Matsushitas and Mitsubishis of Japan—horrible monsters that would love to crush us like bugs.

Personally, I just think things are going to get a bit boring with another decade of Microsoft and Intel running the show.

PHOTOGRAPH BY JAMES McDOON

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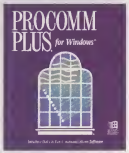

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Circle 170 on reader service card.

Gil Schwartz

Web Head Fred

A mind is a terrible thing to waste. It's even worse when the owner of the former mind in question doesn't know about its wastage. But I'm getting ahead of myself. I'd better start at the beginning if you're going to get anything out of this tale at all. And it's important you do. You could be the next to go, and I wouldn't want it said I didn't try to stop you before it was too late.

It's about my pal Fred. Fred is a strapping young fellow—intelligent, bright of eye, brisk of step, with most of his hair still hanging around up there to see how things are going to work once he hits 30. At his place of employment, he is highly regarded, having enjoyed several promotions over the course of the last few years. Although his success is due to his innate qualities, his productivity and general aura of industriousness have not gone unnoticed. "Fred's a workhorse," you hear about his shop, and "Give it to Fred, he'll get it done." And so far, he has. Whether that trend will continue, only time will tell. But I think not. He's a prisoner of the Web now. And when it comes to the Web, my friends, people check in . . . they do not check out.

Several months ago, in the depths of an urban winter, locked into his office complex like a bird in a paper cage, Fred was given a new area to enterprise. Pretty much by default, he was named the cyberguy in his organization, assigned to get up to speed on e-mail, the infobahn, and associated matters. Nobody else wanted to do it. Most of his associates were taxed to copy a file onto a floppy disk, as, at the beginning, was our friend Fred. "I'm a complete Luddite," he told me at the time, referring, of course, to the medieval dolt who fought to advent off all technology. But Fred is nothing if not diligent, and given the job, the job he set out to do.

First he got onto Prodigy, and found it entertaining. Step One in his decline had been accomplished. Instead of his typical, passionate discussion of matters political, sociological, and sexual (he dates a lot), he began to natter on and on about high-speed modems. The word *interface* came up as a verb in his conversation and was used without irony. I was concerned.

Within a month, he had upped his baud and was cruising around America Online, looking to make chat with a host of unsavory characters. The time he was spending on his system was up. His phone calls to friends were shorter. When I asked him whether he had read any good books, seen any decent movies, watched any engaging television programs, all I got was a damp look.

Then his company, in an act of incredible, callous feeblemindedness, put Fred on the World Wide Web. Oh, the flaccid arrogance of the unwired! I'm sure they thought they were doing him a favor. They were not.

I called him up the other day because I hadn't heard from him in a while. He was rather distracted while we talked, and I could hear mouse clicks in the background. I knew he was surfing even as we spoke, his mind and attention wavering and wandering all over the lot like a junkyard dog on a ramble.

"I fell into the Web and got lost for a while," he said vaguely, when I asked where he'd been. There was a short pause. "It's like a mirror reflecting into a mirror," he added. This was not totally encouraging. I inquired what, exactly, he had been doing lately on the magic carpet to information and entertainment known as the Internet. "I've been looking for pictures of naked celebrities!" he said, and for the first time I caught a hint of the old excitement and dynamism in his voice. "So far I've got Cyndi Lauper and Drew Barrymore and Mariel Hemingway and Pamela Anderson and . . ."

I cut him off. This was getting worse and worse. Was it just sex that was occupying, by his estimate, more than half his working time? It turned out not. That very day, for instance, he looked over the Ren & Stimpy page, glomming up tasty news and chat about America's alternative cat and dog. Then he engaged in a spirited conversation about *Anmaniacs*, the Steven Spielberg cartoon that's a favorite of children and unemployed twenty-somethings nationwide. After that, he downloaded several fractals, which, he reports, are "huge" on the Web, and regarded at leisure a number of saucy video clips from a variety of exhibitionistic Websters, the content of which cannot be described in this magazine. Then he had an e-chat with his "babe from academia," a young woman from a big midwestern university, whose attractiveness he ascertained after seeing the picture she posted of herself on the Web.

"I got her phone number, finally," he admitted. "And if she's anything near as cool as her home page . . ."

The next generation, then, cannot be far off. Two Web People meet. They interface. They mate. And before long, a new node is born who him/herself will upload and download and play in the light of fluorescents and be happy.

What a future it will be! Fred will be there. Will you? Me too!

And by the way . . . just who, exactly, will be minding the store?

A **SAD BUT TRUE** *tale describing the complete* **MENTAL DETERIORATION** *of a perfectly fine individual caused by* **OVEREXPOSURE** *to Internet-related material.*

PHOTOGRAPH BY JAMES McGOON

© 1995 Intel Corporation. †Source: iCOMP® A Simplified Measure Of Relative Microprocessor Performance. Intel Corporation, 1992. ††The 63-MHz Pentium OverDrive processor for most 50-MHz and 25-MHz Intel486™CPU-based systems is available now. The 83-MHz Pentium OverDrive processor for most 66-MHz and 33-MHz Intel486 CPU-based systems will be available later in the year. *Other trade names referenced are the property of their respective holders.

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The IBM PC 300 is ***PCMCIA enabled.*** *(With optional adapter shown.) If you use a laptop too, you'll appreciate the convenience and flexibility this offers.*

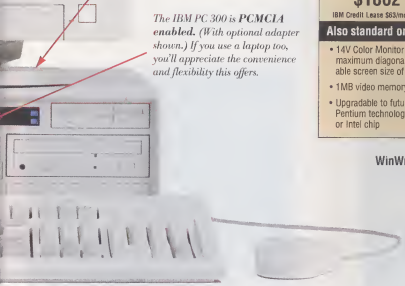

Photo shown with enhanced keyboard and 15V color monitor.

IBM PC 300 SpaceSaver	IBM PC 300 Desktop	IBM PC 300 Pentium
For more power: • an Intel® 486 processor chip • Math coprocessor • Upgradable to 256KB L2 cache • Enhanced IDE 270MB[1] HD (upgradable to 1GB HD) • 4MB RAM (expandable to 128MB) • VESA local bus (upgradable to PCI with Selectabus) • 32-bit VESA local bus graphics ***For expansion needs:*** • A SpaceSaver configuration with 3 slots, 3 bays ***New lower prices:*** 450/DX2 **$1574** IBM Credit Lease $53/month[1] 466/DX2 **$1666** IBM Credit Lease $56/month[1] 100/DX4 **$1862** IBM Credit Lease $63/month[1]	***More power:*** • an Intel 486 processor chip • Math coprocessor upgradable to • 256KB L2 cache • Enhanced IDE 364MB[1] HD (upgradable to 1GB HD, expandable to 4 drives) • 8MB RAM (expandable to 128MB) • VESA local bus (upgradable to PCI with Selectabus) • 32-bit VESA local bus graphics ***For expansion needs:*** • A full Desktop configuration with 5 slots, 5 bays ***New lower prices:*** 450/DX2 **$1891** IBM Credit Lease $64/month[1] 466/DX2 **$1983** IBM Credit Lease $67/month[1] 100/DX4 **$2179** IBM Credit Lease $74/month[1]	***More power:*** • an Intel Pentium™ 60MHz processor chip • Math coprocessor • 256KB L2 cache • Enhanced IDE 540MB[1] HD (upgradable to 1GB HD, expandable to 4 drives) • 8MB RAM (expandable to 128MB) • PCI local bus • 64-bit PCI local bus graphics ***For expansion needs:*** • A full Desktop configuration with 5 slots, 5 bays ***New lower prices:*** Pentium 60 **$2821** IBM Credit Lease $95/month[1] ***Additional options:*** • IBM Enhanced 101-Key board and Mouse, add $40 • 1MB(2) video memory upgrade Pentium 60, add $95 • Internal CD-ROM drive, add $199

Also standard on every IBM PC 300 mentioned above:

- 14V Color Monitor with a maximum diagonal viewable screen size of 13"
- 1MB video memory
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New! Gateway P5-120

Tomorrow's PC? 120MHz and Loaded

Never second-guess how the future will arrive. Case in point: In an exclusive sneak preview of Gateway 2000's spanking-new Gateway P5-120, we found more cutting-edge technologies—a glimpse of the future of business computing—than in any PC you're likely to see for months to come.

For starters, it's the first 120MHz Pentium system to land on a bench in our labs. The CPU comes with a 256K L2 cache, which should make it fast enough to compete with forthcoming offerings from companies like Advanced Micro Devices and Cyrix (see "133MHz P6 and Beyond," page 36).

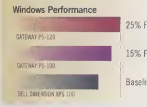
Differences in performance between the 120MHz and 100MHz Pentiums—or between the 120MHz Pentium and a 100MHz DX4 CPU, for that matter—are only incremental when running today's 16-bit x86 applications, but the faster chip's performance should shine under the 32-bit applications just over the horizon. These will be designed from the ground up to take advantage of the Pentium's multiple pipelining and superscalar technologies. Regardless of the application, however, the key to fast Pentium performance is an abundant static RAM (SRAM) L2 cache. You should consider 256K a minimum.

Instant Recall CPU performance isn't the only investment protection the Gateway P5-120 brings to the party. It comes with 16MB of extended data out (EDO) RAM, expandable to 64MB, and Intel's Triton PCI local-bus chipset, which is designed to take advantage of EDO memory. The net effect is roughly a 10 percent improvement in memory performance, thanks to EDO's capability to perform more operations in fewer clock cycles than traditional RAM, thereby reducing wait states (see "Breakthrough Technologies," page 64).

As Pentium throughput goes, eliminating these memory bottlenecks is crucial, especially in graphics and number-crunching operations. Supplies of EDO memory are scarce, however, and not all first-generation 120MHz Pentiums are likely to include it.

In this and other ways, the Gateway P5-120's design is keenly informed by the richer

Burning Up the Bench

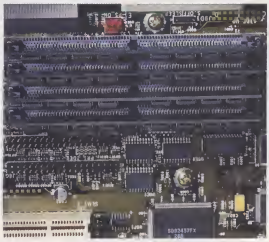


NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 33 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Fastest Ever: Gateway's P5-120 is the nimblest PC we've tested, though competitors loom.

GUIDED TOUR An Inside Peek at the First 120MHz Pentium

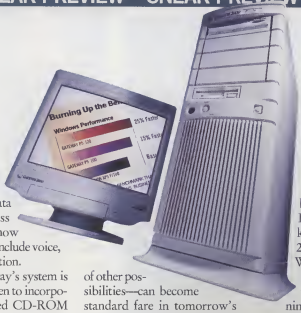
Three Times Four: No more CD shuffle. The Gateway P5-120 has the first quad-speed CD-ROM drive and three-disc changer we've seen.



Memory Breakthrough: The Gateway P5-120 is one of the first systems to use EDO RAM, which raises performance without raising costs.

PHOTOGRAPHS BY ERNIE FRIEDLANDER

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*



(read: bigger) data types that business applications are now adopting. These include voice, video, and animation.

In fact, Gateway's system is the first we've seen to incorporate a quad-speed CD-ROM drive with a three-disc changer (built by Sanyo). Load CDs into the disc cartridge, and you can keep your favorite discs within instant reach. Once the province of network servers, CD changers let software developers spread stand-alone applications across multiple discs so that video-based tutorials, voice recognition engines, animated maps and schematics, and 24-bit photo-quality graphics—among the hundreds of other possibilities—can become standard fare in tomorrow's business applications.

Not that you'll be wanting for traditional storage: The Gateway P5-120 features Western Digital's Caviar AC31600, the first 1.68GB Enhanced IDE hard drive (running on local bus) to hit the streets. Gateway officials promise a SCSI alternative as well, though details were unavailable at press time. But with a 16.7MBps burst data-transfer rate and support for multiple peripherals, why bother? An Enhanced IDE drive just can't keep up with the latest 20MBps Fast- and Wide-SCSI drives. But for a stand-alone workstation running Windows applications, it won't hold up the show. And the convenience of IDE technology is unbeatable, especially now that it supports CD-ROM drives, floppies, and tape backup devices.

Color and Motion The most likely bottleneck in any Windows system is graphics, not drive performance. This explains our mild surprise to find only ATI's Mach 64 accelerator as standard equipment on the Gateway P5-120. Mind

Gateway P5-120

USABILITY: *Big, beautiful monitor, same confusing keyboard.* ****

PERFORMANCE: *Blazing performance that's waiting on better software.* *****

TECHNOLOGY: *A vision of tomorrow.* *****

VERDICT: *Not the perfect PC, but a stunning dollar value.* ****½

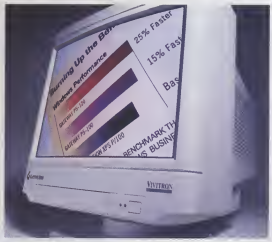
FILEBOX

Gateway P5-120

Features (as tested): 120MHz Pentium, 16MB of EDO RAM, 1.68GB hard drive, three-disc quad-speed CD-ROM drive, 14.4Kbps fax modem with simultaneous voice and data transfer.

$4,299 est. street price
Gateway 2000
(800) 846-2063, (605) 232-2000
Reader Service No. 621

Keeps Its Cool: Based on a 3.3-volt design, the 120MHz Pentium has none of the heat problems that troubled early 5-volt Pentium designs.



Packs More Pixels: The Gateway P5-120's astonishingly low $4,299 price includes a stunning high-resolution 17-inch Trinitron monitor.

New! Gateway P5-120

you, the Mach 64 is no slouch. Only a year ago 64-bit video accelerators rode the cutting edge, and the ATI chip can handily keep pace with the best of them at almost all resolutions. But 128-bit video has arrived with Number Nine's Imagine128 accelerator, as has 3-D acceleration (from boards like Matrox's MGA Impression Plus) and other innovations that make animated business presentations, photorealistic graphics, and complex documents come alive.

Gateway's video setup system comes standard with 2MB of VRAM and provides 72Hz to 75Hz refresh rates even at 1,024 by 768 resolutions. For a bit more graphics speed, you can ante up $299 for the MGA Impression Plus with 3-D acceleration. Given the Gateway P5-120's $4,299 price, it's a small investment for that extra performance edge.

But the best part of all is that the Gateway P5-120 comes attached to a gorgeous 17-inch Trinitron monitor, which features digital controls and richly saturated hues. It's the best we've seen from Gateway.

Talk to Me There are no compromises in communications, either. The system comes standard with a 28.8Kbps fax modem. The modem features simultaneous data and voice capabilities, one of the newest and (for mobile computing) one of the most practical modem innovations to arrive in quite some time.

By dividing the voice band into two physical channels, both data and voice pass over the same phone line at the same time, neither band taking priority over the other thanks to advanced compression techniques. The drawback? Voice quality suffers (8-bit, 8kHz sampling). Look for improved 16-bit sampling to arrive soon.

The real value of bringing telephony to the PC lies in the advanced voice-mail management that many systems are beginning to offer, which can help simplify life. Most businesspeople today rely on a dizzying array of technologies for information and communications, from pagers and PDAs to notebook PCs, cellular phones, and remote links to company network and voice-mail systems. Consolidating these various technologies into a single intelligent repository, so that data, whatever its form, can be shared, managed, and processed seamlessly—even invisibly—is clearly where the future of computing lies.

Visionary The Gateway P5-120 packs enough muscle to process the kinds of large and diverse data types that will increasingly elbow their way into our lives. It's not a perfect machine, and the software that will best take advantage of its capabilities lies just out of reach. But forget lofty visions of the future for a minute and consider its price: $4,299. Suddenly the future looks very promising indeed. MARTY JEROME

Guide to the Ratings
in each applicable area—usability, performance, technology, and verdict—a product is awarded from one to five stars. In some cases, other factors (such as price) also affect a product's verdict.

* * * * * **Excellent** A market leader that offers exceptional performance.
* * * * **Good** Excels in a few areas; a good buy, though not perfect.
* * * **Acceptable** Average for its class; a justifiable purchase.
* * **Poor** Out-of-date or substandard, possibly offset by some positive features.
* **Unacceptable** Missing necessary features or suffering from subpar implementation; avoid.

OVERVIEW BREAKTHROUGH TECHNOLOGIES

So the Gateway P5-120 provides a peek at the future . . . at least, the near future. Meanwhile, a whole stable of technologies is sailing toward the box on your desk, each promising to transform the PC as we know it. How they will affect your work remains to be seen, but two trends are clear: Faster subcomponents will help keep pace with exponential increases in CPU power, and the capability for systems to handle larger—and more—data types is a sure bet.

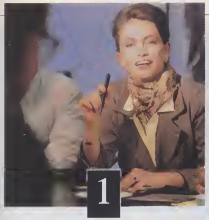
CPU Advanced Micro Devices' K5 and Cyrix's M1, both due this summer, should provide roughly the same processing power as the 120MHz Pentium. At about the same time, however, Intel's new P6 CPU should arrive—ready to duke it out with Motorola's latest generation of RISC-based PowerPCs.

MEMORY EDO RAM's greatest benefit is that it adds almost nothing to the cost of a system while boosting memory performance by about 10 percent. Another configuration for faster memory performance: larger L1 and L2 SRAM caches.

STORAGE Enhanced IDE keeps pushing the limits of capacity and performance as stand-alone workstations now store gigabytes of data. Still, nothing beats the throughput of Fast SCSI-2, especially for database and graphics chores. Optical drives have also made great strides. Plextor has already announced the first 6X CD-ROM drive, and faster double-sided and high-density drives will soon emerge.

VIDEO Today 128-bit video accelerators reign supreme as the performance leaders on the desktop. But look for new memory technologies to migrate into video cards, the most exciting of which is dual-ported Window RAM (WRAM), which maintains high throughput even as resolution, refresh rates, and pixel depth increase. It's faster (and cheaper) than VRAM. The newest cards also offer accelerated 3-D rendering, MPEG playback, and motion video acceleration.

I/O The lowly serial port is in dire need of an overhaul. Texas Instruments and Apple Computer, with support from other big guns, are currently pushing their FireWire standard, which would raise serial throughput by up to ten times the speed of traditional serial ports. Meanwhile, Intel has another standard in the works.



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We have a two-inch-thick employee manual that is also sent to our European offices. Power Translator helped me translate it into the local languages of our branch offices. It even imported the original word processing file, so I didn't have to waste time typing. Now all our employees feel they're part of the team, and I'm a hero!

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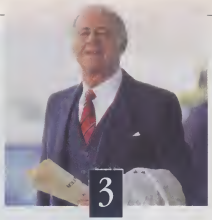

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Since NAFTA went into effect, I've been expanding my business into Mexico. Using Power Translator I've established new distributor relationships in Mexico City. And by customizing the dictionary, I only had to enter specialized business terms once! Although I still use professional translators for contracts and legal documents, Power Translator helps me understand the basic stuff in Spanish right from the start.

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Circle 241 on reader service card.

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Circle 180 on reader service card.

New! HARDWARE: MessagePad 120, Marco, Envoy, Magic Link · Command Center · HiNote Ultra vs. Ascentia 810N

Globalyst 360TPC, Aptiva 530, Advantage Adventure

Voice Mail from Your Keyboard

After years of wishful thinking, computer makers have finally carved out a niche for their products alongside other common household appliances. Thanks to a Christmas boom, you can find a PC in about one-third of all American households today. In fact, AT&T, IBM, and AST think the home PC has more in common now with the telephone than the video game player.

Each company has a line of full-powered systems featuring a bundle of telecommunications conveniences—accessible from the comfort of an all-embracing graphical interface. They're also fully equipped with multimedia peripherals like CD-ROM drives, sound cards, and speakers. Best of all, you can find them at bargain-basement prices.

AT&T Phones Home You can't think of telephony without thinking of AT&T, so it should come as no surprise that Ma Bell's Globalyst 360TPC includes plenty of phone tricks. The TPC in this system's name refers to AT&T's 32-bit, DSP-based add-in board. You'll also find a 14.4Kbps fax, a 19.2Kbps data modem, voice messaging, and 16-bit sound with a Sound Blaster–compatible wavetable synthesizer.

All of the Globalyst's telecommunications options are accessible from the Personal Communications Center, a graphical onscreen representation of a fully digital phone/fax/answering machine. Dial from its onscreen phone book or the included copy of Borland's Sidekick for Windows using numbers found in the "70 Million Households Phone Book" or in ProPhone for Windows, a nationwide listing of toll-free numbers and information. Sure beats letting your fingers do the walking.

But it doesn't stop with simple autodialing. You can assign coworkers or family members their own personal voice and fax mailboxes, both of which can be reviewed and updated from a remote telephone.

AT&T's system will also wake up to answer the phone or send a late-night fax, then go back to sleep. And because its TPC board has AT&T's multitasking operating system, you can send faxes while listening to your messages, viewing Video for Windows clips, or playing or recording MIDI files from the bundled Sound Explorer. The Globalyst 360TPC's stereo speakers even have a full-duplex microphone built in for message recording or you can use your telephone handset.

Answers from Aptiva Like the Globalyst 360TPC, the Aptiva 530 makes good use of homegrown digital signal processing technology, but with a couple of twists. The Aptiva will also wake up from its energy-saving slumber to take a phone message or send a late-night fax at up to 14.4Kbps. But when it goes back to sleep, it leaves the power light blinking so you can see if you have a fax or phone message without repowering the system. You can even turn the Aptiva off in

Globalyst 360TPC

USABILITY: *Intuitive onscreen phone/fax/answering machine.* ★★★★½

VERDICT: *Just what you would expect from Ma Bell—lots of telephony smarts in a solid machine.* ★★★★

Aptiva 530

USABILITY: *Just the right amount of hand-holding, but we'd like to see more applications to leverage telephony.* ★★★½

VERDICT: *A creative package, albeit a bit slim on standard hardware and software features.* ★★★★

Advantage Adventure

USABILITY: *Clean and organized telephony interface for managing communications.* ★★★★½

VERDICT: *A speed merchant with telephony extras that don't add to the system price.* ★★★★½

SIDE BY SIDE PUT A PHONE IN YOUR PC

AT&T Globalyst 360TPC: Thanks to the combination of an AT&T TPC communications board and the Personal Communications Center software, the Globalyst provides the highest level of telecommunications for a home-based business. However, raw system speed of this 66MHz 486DX2 was only middling.

IBM Aptiva 530: The Aptiva includes all the telecommunications basics of the other two systems as well as power management features that let you leave it on all the time. But the most unique feature of this system is that it lets you control your applications using voice commands. Now where's our Pentium version?

AST Advantage Adventure 6075p: The Advantage Adventure offers a basic set of communications tools enhanced by a fast 75MHz Pentium processor, quality multimedia components (like the quad-speed CD-ROM drive) and a big bundle of software. At just $2,399, it all adds up to a very good deal.

PHOTOGRAPHS BY ARNOLD TOSKILO

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

mid-application, and when you reboot it takes you right to where you left off.

Schedule the Aptiva to wake you up to the strains of your favorite audio CD and download a morning "newspaper" for you with online news gleaned using the Journalist news retrieval and page layout program that ships with it. Want to see how your money is doing? Have the system call the Reuters Money Network in the morning to fetch the latest stock and bond prices.

The Aptiva's most distinguishing feature is its IBM-designed voice recognition system. Add that to IBM's directional microphone, and you'll be ordering many of your favorite Windows applications around with voice commands. You can even create your own voice macros to issue commands for less widely distributed Windows programs. And like the Globalyst, the Aptiva comes with a basic software bundle.

Working the Advantage

AST's Advantage Adventure 6075p is less flashy than the Aptiva and the Globalyst, but no less functional. Its phone, fax, and data hardware are built from off-the-shelf components, but these are high in quality and there are plenty of them. There's also a 75MHz Pentium that drives it all.

Communications is the centerpiece of AST Works, which is a more graphical and better organized spin on the basic Windows desktop. You'll need it, too, because the desktop is bulging with applications, utilities, and communications services. This isn't a second-best collection like we saw in the old days of home computing. Rather, it's a best-seller list: Lotus Organizer, Microsoft Works for Windows, WinFax Lite, and Quicken for Windows, to name a few.

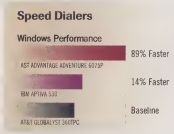
You'll also find numerous utilities on the desktop that let you get your home or home-office life organized, from keeping an inventory log and maintenance records of your automobiles and appliances to setting up individual phone books, diaries, and profiles of family, friends, and coworkers.

Like the Globalyst 360TPC, AST Works' pop-up onscreen speakerphone lets you quick-dial as well as manage its answering machine, fax logs, and bulletin board for fax, voice, or pager messages. It's integrated with the Lotus Organizer contact manager, making it well-suited for the home-based business.

Who Ya' Gonna Call? All three of these systems include power management with sleep mode and are preinstalled with sign-up software for the major online services. And in the event of a problem, a service technician can dial up, analyze, and fix your PC without your help.

AT&T's TPC board and multitasking software make the Globalyst 360TPC the most cutting-edge communications center of the lot, while the Aptiva 530's instant-on and voice-command capabilities are unique in their own right.

But the Advantage Adventure 6075p has all of these functions plus a processor and software bundle that eclipse the other two—without adding to the price. It looks to be the best overall value. MIKE HOGAN



Fast Talkers: IBM and AT&T had only 66MHz 486DX2 systems to give us for this story, but 75MHz Pentium models with quad-speed CD-ROM drives should be available soon.

PICKS PC SWITCHBOARDS

All the latest communications whizbang	AT&T Globalyst 360TPC
The basics plus voice recognition	IBM Aptiva 530
The best soup-to-nuts communications bargain	Advantage Adventure

Stay in Touch: AT&T's Globalyst 360TPC offers the most in the way of cutting-edge communications features, while the strengths of IBM's Aptiva 530 are its voice command and recognition. Our top pick? AST's Advantage Adventure 6075p for its first-rate multimedia extras (including a quad-speed CD-ROM drive and 75MHz Pentium) and tightly integrated apps for managing communications.

FILEBOX

Globalyst 360TPC

Configuration Tested: 66MHz 486DX2, 8MB of RAM (expandable to 64MB), 420MB hard drive, 15-inch monitor.

Multimedia: Personal Communications Center using a 32-bit DSP for a 14.4Kbps fax modem, 19.2Kbps modem, voice messaging, dual-speed CD-ROM drive, 16-bit audio, stereo speakers.

$2,383 est. street price
AT&T Global Information Solutions
(800) 447-1124, (513) 445-5000
Reader Service No. 622

Aptiva 530

Configuration Tested: 66MHz 486DX2, 8MB of RAM (expandable to 128MB), 424MB hard drive, 15-inch monitor.

Multimedia: 14.4Kbps fax modem with voice messaging, dual-speed CD-ROM drive, 16-bit wavetable audio, stereo speakers.

$2,299 est. street price
IBM PC Direct
(800) 426-2968
Reader Service No. 623

Advantage Adventure 6075p

Configuration Tested: 75MHz Pentium, 8MB of RAM (expandable to 128MB), 540MB hard drive, 15-inch monitor.

Multimedia: 14.4Kbps fax modem with voice messaging, quad-speed IDE CD-ROM drive, 16-bit audio, stereo speakers.

$2,399 est. street price
AST Research
(800) 876-4278, (714) 727-4141
Reader Service No. 624

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Circle 186 on reader service card.

Wired from the Palm of Your Hand

Where were VCRs before 1983? Or e-mail before 1988? Or CD-ROMs before 1993? Nowhere. But look at them now. Some think personal digital assistants (PDAs) are similarly poised to take off. Only two years after Apple's Newton gave tangible form to the PDA vision, they may be coming into their own. Dataquest expects PDA sales to double this year and double again in 1996 to more than 2 million units worldwide.

Credit the latest wave of handhelds for these increases: Apple's third-generation Newton MessagePad 120, Motorola's fraternal twins, Marco and Envoy, and Sony's Magic Link Personal Intelligent Communicator 1000. This new crop overcomes early PDA problems such as limited communications, clumsy desktop links, limited memory, and poor handwriting recognition (well, it's improved anyway, especially with third-party add-ons like Palm Computing's Graffiti). Equally important are rapid developments in the communications infrastructure upon which so much PDA functionality depends (witness AT&T's PersonaLink Services).

Tools, Not Toys It's surprising how many ways there are to design a hand tool that can elicit a "Wow!" from anyone who sees it. *Buck Rogers* collided with *Star Trek*, and cool gadgetry of all shapes and sizes fell to earth. Each is such a different combination of hardware and software that it doesn't make sense to review PDAs the same way we do PCs—with feature-by-feature comparisons and quantitative measures of Windows processing power. None use Windows—WinPad handhelds are at least a year away—or even the Macintosh OS.

PDAs have operating environments more appropriate to their missions: Apple's Newton for the MessagePad 120 and the Marco, and General Magic's Magic Cap for the Envoy and the Magic Link. These devices offer parallel functionality, but with interface differences that to a great extent define their use.

In Touch with the World Motorola is in the unique position of offering you one from Column A and one from Column B. The key added value that both the Marco and the Envoy have over the MessagePad and the Magic Link ("Sony Waves a Magic Message Wand," January, page 84) is a built-in wireless modem that leaves their PC Card slots free for memory and other peripherals. No telephone cords tether you to what some people think is a PDA's *raison d'être:* communicating.

With the Marco, you communicate primarily—but not exclusively—via the wireless ARDIS PersonalMessaging network, which covers most U.S. cities. Phone home, dial in to your favorite commercial online service, or send faxes from an office lobby, cab, or seaside resort.

Motorola's Marco also lets you upload faxes or download e-mail and alphanumeric pages. Alternatively, you can travel the Internet with RadioMail to download stock quotes, headline news, and sports as well as enjoy similar messaging services as those on ARDIS. The Envoy adds AT&T's PersonaLink Services for use with a built-in 9,600/2,400-bps landline modem, which is usually a cheaper way to go, particularly for long sessions online.

The squarish, raised platform designs of the Marco, Envoy, and Magic Link seem to us the most practical and

MessagePad 120

USABILITY: *The largest complement of applications, sleek design.* ****

VERDICT: *The oldest and perhaps most refined PDA, but communications are still limited.* ****

Marco

USABILITY: *Newton MessagePad utility, but wireless links ease communications.* ****

VERDICT: *Handwriting and messaging from anywhere in the field.* ****

Envoy

USABILITY: *Familiar desktop icons in Magic Cap make it easy to get to work.* ****

VERDICT: *Our favorite pocket communicator—at least so far.* ****½

Magic Link 1000

USABILITY: *Magic Cap interface invites you to explore.* ****

VERDICT: *A cheaper Envoy without built-in or wireless communications.* ****

SIDE BY SIDE NEWTON-BASED HANDHELDS TAKE NOTES

Newton MessagePad 120: Apple's $599 MessagePad is the oldest and in some ways the most refined PDA, with its growing software base (1,000 applications and counting) and subtle improvements in hardware design.

Marco: Call it a wireless version of the MessagePad; Motorola's Marco is the first PDA on the market to include both the Newton paper-like interface and built-in wireless communications. Prices for the Marco start at $899.

PHOTOGRAPHS BY ARNOLD TORELLO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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Circle 159 on reader service card.

PHOTOGRAPHS BY ARNOLD TIOSEJO

New! HARDWARE: MessagePad 120, Marco, Envoy, Magic Link 1000

comfortable. But there's something about the MessagePad's curvy notepad-like form that transcends utility. Many users will prefer the MessagePad simply because it has the indefinable Apple look and feel. And that's not a bad reason.

Another plus: Being the oldest PDA, the MessagePad has by far the largest complement of applications—about 1,000 in all. Maybe a third of these are for sales automation, financial services, health care, and other fields likely to need a PDA. Beyond that, some excellent third-party applications like Intuit's Pocket Quicken (see "Put an Accountant in Your Pocket," page 109) are starting to accompany PDAs. These applications round out all of the PDA makers' basic bundles of appointment, Rolodex, notetaking, and other information management utilities.

Take Notes Handwriting recognition has improved considerably in Newton version 1.3, but you still have to calibrate the operating system to recognize your penmanship, and you must take care when forming your letters. You can fix mistakes using an onscreen QWERTY keyboard.

But if handwriting is important to you, there's always the highly recommended Graffiti software for Newton ($79). Graffiti also brings handwriting recognition to Magic Cap devices, which otherwise save your scribblings and drawings as memory-gobbling bitmaps. The main data-entry tool on the landscape-oriented Envoy and Magic Link is an onscreen QWERTY keyboard twice the size of Newton's.

Look, Feel, Then Choose Buying a PDA is a far more personal choice than buying a PC or notebook. Not everyone can live with the tiny screens or fit one comfortably in the palm of their hand.

If you're into data entry in the field or notetaking at business meetings, a MessagePad with Graffiti might be your best bet—and it's the cheapest solution by far. The Marco gives you a paper-like interface similar to Newton's and wireless communications, but it costs several hundred dollars more than Apple's latest PDA.

If volume data and text entry isn't high on your to-do list, you may prefer Magic Cap's intuitive rooms-and-buildings metaphor: Navigating is as easy as tapping on common office objects like drawers and filing cabinets. The Magic Link is the cheapest way to get into Magic Cap, at least until you add communications options. With both wireless and land-line modems built in and two available PC Card slots for adding peripherals, the Envoy is the most full-featured (and expensive) Magic Cap device out of the box. It also offers the most messaging services.

Frankly, we're still in the midst of the low-volume, early adopter phase of PDAs, so prepare to wince a bit as the clerk swipes your credit card for any of these units. And yes, there's still room for improvement. But clearly palmtop productivity is quickly becoming a reality for the wandering info worker. MIKE HOGAN

SIDE BY SIDE MAGIC CAP COMMUNICATORS

Envoy: Motorola's Envoy includes a built-in wireless modem, leaving its PC Card slots free for more memory and other add-ins. Better yet, no telephone cords tether it to your office or hotel room. Prices range from $999 to $1,499.

Magic Link 1000: The first portable to use the friendly Magic Cap interface, Sony's $995 Magic Link costs less than the Envoy, but it lacks PC Card expansion and some of the wireless options of Mototola's devices.

FILEBOX

Newton MessagePad 120

Configuration: ARM 610 RISC processor, 1.4MB of memory, 4MB of ROM.

Weight and Size: 1 pound, 8 inches high, 4 inches wide, 1.2 inches thick.

$599 est. street price
Apple Computer
(800) 385-3890, (408) 996-1010
Reader Service No. 625

Marco

Configuration: ARM 610 processor, 1MB of memory, 4.5MB of ROM.

Weight and Size 1.8 pounds, 7.5 inches high, 5.8 inches wide, 1.4 inches thick.

$899 to $1,399 est. street price, depending on service option
Motorola Wireless Data Group
(800) 894-7353, (708) 756-5000
Reader Service No. 626

Envoy

Configuration: Motorola I-68349 processor, 1MB of memory, 4MB of ROM.

Weight and Size: 1.7 pounds, 5.8 inches high, 7.5 inches wide, 1.2 inches thick.

$999 to $1,499 est. street price, depending on service option
Motorola Wireless Data Group
(800) 894-7353, (708) 756-5000
Reader Service No. 627

Magic Link 1000

Configuration: Motorola I-68349 processor, 512K of user memory, 4MB of ROM.

Weight and Size: 1.2 pounds, 5.2 inches long, 7.5 inches wide, 1 inch thick.

$995 est. street price
Sony
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Reader Service No. 628

PHOTOGRAPHS BY ARNOLD TIERSELIO

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Which is just the sort of ingenious functionality you'd expect from Quarterdeck, the folks who brought memory management to millions with the legendary QEMM.®

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Wherever you buy CleanSweep, if you're not thrilled, you can return it within 30 days for a full refund. No questions asked. Don't worry. CleanSweep uninstalls itself.

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Circle 187 on reader service card.

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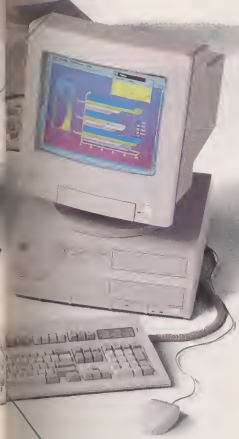

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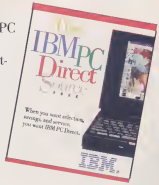

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USABILITY: *Software utilities work seamlessly with hardware; painless installation.* ★★★½
TECHNOLOGY: *16-bit Sound Blaster–compatible, 14.4Kbps or 28.8Kbps fax modem, CD-ROM interface.* ★★★★½
VERDICT: *The next best thing to a personal assistant—every small business should have one.* ★★★★½

SNEAK PREVIEW

Still reaching for your phone every time you need to make a call? Still feeding paper into the fax machine? There's an easier way. Diamond's Command Center 1440 telephony bundle puts a complete voice-mail and fax-on-demand system in your PC for under $200. This combination of an answering machine and a fax modem not only frees up valuable desk space but its voice-mail and fax-on-demand features make almost any sole proprietorship look like a conglomerate.

At the core of the Command Center is a single card that holds a fax modem (available in both 14.4Kbps and 28.8Kbps versions) and a 16-bit Sound Blaster–compatible sound card. A microphone, speakers, and telephony software round out the system.

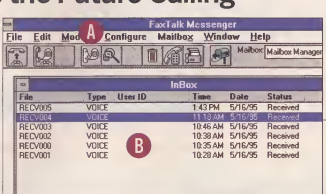
Leave a Message To help you put the board to work, Diamond includes a complete software suite with the Command Center. The voice-mail manager supports an unlimited number of mailboxes, so callers can follow audio prompts to press buttons on their phones and leave messages for specific people. Voice messages are saved as compressed VOX files, so they don't eat up disk space. In our tests, a 20-second message created a 5K file. Something we'd like to see in future versions? A way to convert VOX files to Windows' standard WAV format for forwarding voice messages via e-mail.

The Command Center's fax-on-demand features, meanwhile, are an excellent way to get the word out about your business without feeding the fax machine. Load a library of commonly requested documents into your hard drive, and people phoning in get audio prompts for the available documents they can receive on their own fax machines. After making a selection and entering a fax number, the appropriate documents are faxed off in seconds. Fax-on-demand is ideal for customer support and for inexpensively distributing newsletters and catalogs.

The Works Diamond also bundles a personal information manager and calendar utility that supports Caller ID. Incoming calls can be linked to the appropriate entries in your address book. Startup kits for CompuServe, America Online, and the popular Web browser NetCruiser are bundled as well.

There are other hardware solutions that offer many of the Command Center's features, such as Boca Research's SoundExpression 14.4VSp and the Best Data ACE5000, but none offers the same rich array of features and tight integration between fax, data, and voice.

Diamond is pricing the Command Center within anyone's budget. It should sell on the street for around $199 for the 14.4Kbps version and $299 for the 28.8Kbps version. At these prices, every small business and home office should consider adding the Command Center 1440. YAEL LI-RON



Personal Attendant: Diamond's Command Center 1440 lets you manage your voice mail, phone calls, and faxes—all from your Windows desktop. Voice-mail messages are stored on your hard drive as sound files.

A. Configure is where it all happens. Use it to set up your mailboxes, record outgoing messages, and straighten out your IRQs and DMAs.

B. The Command Center's **InBox** is where all incoming voice mail is displayed. To listen to a message, simply double-click on the entry.

C. The Command Center includes communication features for every need, including an **OutBox** for faxes and messages, a **Transaction Log** to record your every move, a **Phonebook**, and a **Filing Cabinet** for archiving old messages and transactions.

Modem in Disguise: At the core of the Command Center is a single add-in card that holds a fax modem (available in both 14.4Kbps and 28.8Kbps versions) and a 16-bit sound card. The hardware is software configurable, so installation is painless. Connectors for Mitsumi, Panasonic, and IDE CD-ROM drives will save you an expansion slot.

PHOTOGRAPH BY ARNOLD TIDSLEY

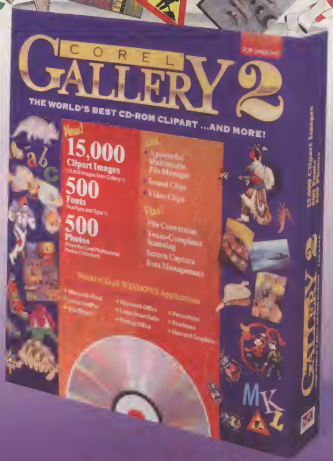
FILEBOX

Command Center 1440

Competition: The Best Data ACE5000 and Boca Research's SoundExpressions 14.4VSp compete on core telephony features, but the Command Center 1440 offers better software and hardware integration.

$199 est. street price (14.4Kbps version), $299 (28.8Kbps version)
Diamond Multimedia Systems
(408) 325-7000
Reader Service No. 629

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*



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T2400CT FEATURES:
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- 8KB cache
- 8.4" dia. color TFT-LCD active matrix display
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- 8MB RAM expandable to 24MB
- 6.5 lbs.

T2400CS FEATURES:
- i486™DX2/50MHz, 3.3v
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Circle 215 on reader service card.

Top-Drawer Totables Shed Pounds

Get with it. The term *subnotebook* is absolutely passé. DEC's new HiNote Ultra CT 450 and AST's Ascentia 810N aren't lesser-than notebooks. They pack everything you expect from full-sized notebooks—large displays, floppy drives, and touch-typist keyboards—into much smaller and lighter packages. They're what most of us have been wanting for years. These aren't notebooks or subnotebooks; they're more like notepads.

That's especially true of the HiNote Ultra CT 450. It's not going to break any price barriers at $4,999, but once you get a look at DEC's amazing design, your thoughts about sticking to the budget might just fly out the window. And for good reason.

Ingenious Design The HiNote Ultra measures slightly more than an inch in height when you remove its base-mounted floppy drive (every portable PC should work this way). Its tote factor is just over 4 pounds. Add to that a crisp 9.5-inch TFT color display and a decent keyboard, and the HiNote Ultra is tough to beat. For the money, it's clearly a notch above Toshiba's Portégé T3600CT. About the only system that can stand in its way is IBM's ThinkPad 701C—otherwise known as the Butterfly—which has the luxury of a larger keyboard (see "The Future of Portables Unfolds," March, page 56).

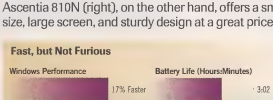
But there's more to the HiNote Ultra. It has built-in infrared wireless data communications with TranXit infrared software, so you're ready for mobile computing from the start. The HiNote Ultra is also one of the first notebooks to adopt a Plug-and-Play BIOS, so it's ready for Windows 95—that is, whenever the folks at Microsoft are ready.

Little Bag of Tricks The Ascentia 810N is not as small or lightweight as the HiNote Ultra—it weighs 5.9 pounds—but it impressed us nonetheless. Here's the scoop: The Ascentia 810N is a traditional notebook scaled down by roughly 17 percent. The clincher is that AST squeezed in a 10.4-inch dual-scan screen. It's powered by a Cyrix 66MHz 486DX2. The system we tested sells for just $2,858—pocket change compared to the HiNote Ultra.

There's another notable difference: The Ascentia 810N's battery life was four and a quarter hours in our tests, while the HiNote Ultra ran out of steam after just over three hours. We didn't torture test these mobile PCs, but the Ascentia 810N has the sturdier design.

The HiNote Ultra CT 450 is a near perfect compromise between small size and big display. The only catch is its cost. That's where AST comes in. If you're on a budget, the Ascentia 810N is one of the best values you can find in a small notebook. SCOT FINNIE

Heavy-Duty Lightweights: DEC's HiNote Ultra CT 450 (left) is fast, light, and packs in techno-goodies like an infrared port and Plug-and-Play BIOS. AST's Ascentia 810N (right), on the other hand, offers a small size, large screen, and sturdy design at a great price.



The Classic Trade-off: The HiNote Ultra proved faster than the Ascentia 810N in performance tests, but the Ascentia's battery lasted 84 minutes longer.

HiNote Ultra CT 450

USABILITY: *Excellent design, easy-to-use controls.* ★★★★
PERFORMANCE: *Not Pentium speeds, but you won't be disappointed.* ★★★★
TECHNOLOGY: *Ground-breaking design, Windows 95 ready.* ★★★★★
VERDICT: *A winner that will cost you.* ★★★★½

Ascentia 810N

USABILITY: *Tried-and-true keyboard and design, bright 10.4-inch display.* ★★★½
PERFORMANCE: *Not a screamer, but the battery lasts and lasts.* ★★★½
TECHNOLOGY: *Smaller than a notebook, with yesteryear's 66MHz DX2 processor.* ★★★
VERDICT: *Excellent value in a sturdy and affordable system.* ★★★½

FILEBOX

HiNote Ultra CT 450

Features (as tested): 3.3-volt Intel 75MHz DX4 CPU, 8MB of RAM, 340MB hard disk, local-bus accelerated video, two Type II PC Card slots, removable floppy drive, built-in infrared wireless data communications, Business Audio, Plug-and-Play BIOS.

$4,999 est. street price
Digital Equipment Corp.
(800) 722-9532, (508) 493-5111
Reader Service No. 630

Ascentia 810N

Features (as tested): 3.3-volt Cyrix 33MHz 486DX2 CPU, 8MB of RAM, 340MB hard disk, local-bus accelerated video, two Type II PC Card slots, floppy drive, integrated trackball.

$2,858 est. street price
AST Research
(800) 876-4278, (714) 727-4141
Reader Service No. 631

PHOTOGRAPH BY ARNOLD TOBIAS

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

[?]

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- 3-Year Limited Parts Warranty

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- 3.5" Diskette Drive
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New! SOFTWARE: VoiceType Dictation · Peachtree First Accounting · Astound 2.0 for Windows · d-Time10

Personal Oracle7 and Visual FoxPro 3.0

Visualize Better Databases

SNEAK PREVIEW

Database management in the nineties is no longer a question of whether to maintain data on a mainframe or a stand-alone PC. If your mission-critical data is found on a server but needs to be reached and manipulated from a PC that's on the network, a client-server setup is the only way to go. It speeds operations by minimizing the impact on the back end (the server) and by handling as much of the database management chores on the front end (the local system) as possible.

We looked at two major desktop database management systems (DBMSs) for developers that mark client-server computing's entry into the desktop mainstream: Personal Oracle7 is Oracle's first offering in the desktop arena, while Microsoft's Visual FoxPro 3.0 is a giant step in FoxPro's evolution. Both products include state-of-the-art visual development tools and drivers for client-server processing, and they offer plenty of muscle.

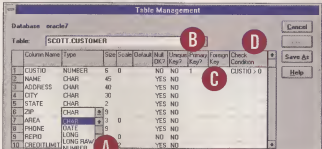
The Oracle Appeal Personal Oracle7 is a stand-alone relational database (not a server) that lets you write GUI applications on PCs and port these applications unchanged to any of the dozens of platforms that Oracle supports. It's not for novices—you need to know structured query language (SQL) or use a product like Microsoft's Access or Gupta's SQLWindows as a front end to get to your data. Rather, Personal Oracle7 is perfect for developers who want to use their favorite Windows tools with client-server databases.

SQL expertise isn't required for *maintaining* a database, because Personal Oracle7's team of graphical managers lets you perform administration functions by pointing and clicking. If there's a task that needs doing, there's a manager to do it. The Database Manager starts and shuts down the database; the User and Password Managers let you set up user accounts and maintain passwords; the Backup and Recovery Managers let you . . . well, you get the idea.

With the Object Manager, you can create and modify database objects such as tables, indexes, remote database links, and views. You can give a synonym of up to 30 characters to a table with a cryptic DOS filename to make it easier to identify. Similarly, Personal Oracle7 provides eight data types for defining table columns (*fields*) and lets you create validation rules (*check conditions*) that are stored within the table and take effect automatically.

Among the other tools in Personal Oracle7 are utilities for increasing the size of a database, moving data from one Oracle database to another, and importing ASCII files from non-Oracle sources. To complete the package, Personal Oracle7 comes with Objects for OLE, Oracle's 16-bit OLE 2.0 interface for C++ and any Microsoft Visual Basic applications you might be using.

SQL Spoken Here Data operations in an Oracle database execute using SQL statements. Personal Oracle7 has its own superset of the standard (ANSI/ISO) SQL language as well as an extension called PL/SQL. This extension lets you link several SQL commands through procedural logic and adds features such as data encapsulation, information



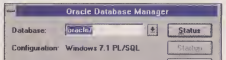
A. Eight different **data types** are available for field definitions.

B. The **Primary Key** helps establish a unique link between tables. Primary and Foreign keys must be defined when creating database triggers.

C. The **Foreign Key** is a field in one table that's a Primary Key in another table, and this relates the two tables.

D. **Check Condition** is a validation rule that is stored with the table.

Application Revelation: Personal Oracle 7, Oracle's newest database manager for SQL developers, includes visual tools for creating applications on PCs and porting them—unchanged—to any of the dozens of platforms that Oracle supports. The Table Management window, which lets you create table definitions, is one component of the Object Manager.



Is Your Database Running? Without knowing the first thing about SQL, you can start and stop an Oracle database, determine the status of the system, and change its configuration—all from the Database Manager window.

Personal Oracle7

USABILITY: *Graphical tools make administrating databases easy.* ★★★★

VERDICT: *A client-server database development tool for the desktop—what a concept!* ★★★★½

Visual FoxPro 3.0

USABILITY: *Superb Wizards, object-orientation let you reuse code; Project Manager is a great tool.* ★★★★

VERDICT: *Windows xBASE developers, what are you waiting for? This is the future.* ★★★★½

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

New! SOFTWARE: Personal Oracle7 and Visual FoxPro 3.0

hiding, overloading, and exception handling. You'll need at least 16MB of RAM on your system, however, to install PL/SQL and SQL Plus. Otherwise, you'll have to be content with Personal Oracle7's SQL and its interface, SQL*DBA.

With PL/SQL you can group statements together, assign a name, and store them as a *procedure*. When attached to a table, a procedure can be executed automatically to validate changes to the data. These database *triggers* help to enforce parent/child relationships (*referential integrity*) between tables.

Whether you're looking to develop client-server applications on your PC or to maintain an SQL database locally, Personal Oracle7 has all the tools you need to make it come true. Unless you're an xBASE developer, that is.

xBASE Relief dBASE and FoxPro developers who want to develop robust client-server applications using the familiar xBASE language will find ample reason to upgrade to Visual FoxPro 3.0. Previous versions (2.5 and 2.6) were simply ported to Windows from the DOS version, but this release was written for Windows from the ground up. This is a 32-bit development environment that offers a comfortable migration path for scores of xBASE developers. The language has been enhanced with object-oriented extensions, and as the name implies, the development tools are fully visual.

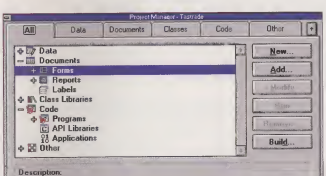
To cut down on your coding time, you create objects in a convenient drag-and-drop environment. You can modify these objects using visual tools. This is an unusual approach for a development tool because most developers want to go under the hood and tweak the code manually. Borland's dBASE 5.0 for Windows, for example, features two-way tools for modifying the source code, and changes in the code are then reflected in design-surface objects.

The Project Manager is Visual FoxPro's main repository of all data tables and related objects (forms, reports, programs, object classes, and so on). To generate an executable program from a project, click on the Build button and Visual FoxPro takes over.

Help for Pros Visual FoxPro's usability enhancements include 18 Wizards to coach you through application distribution, code documentation, and other phases of development. ODBC 2.0 provides access to data in many formats, including dBASE, SQL Server, Oracle6, and Oracle7. OLE 2.0 support lets developers use third-party 32-bit OLE controls (OCXs). You can migrate old dBASE or FoxPro code without any additional coding, though you will probably want to tweak the code to take advantage of the object-oriented muscle. However, chances are that it will be easier to write the whole program from the ground up.

If you're a seasoned xBASE developer, Visual FoxPro 3.0 is the perfect development environment for 32-bit Windows applications for any platform, including Windows NT and (soon) Windows 95. SQL developers, on the other hand, should have a look at Oracle's client-server development tool, Personal Oracle7.

ROGER W.SAUER AND YAEL LI-RON



Easy Builds: Visual FoxPro 3.0, Microsoft's 32-bit upgrade to the premier development platform for xBASE developers, has been redesigned for Windows from the ground up and contains all the necessary objects for streamlining database application development. The language has been enhanced with object-oriented extensions, and the development tools are fully visual. To create a run-time version of your application, simply click on the Build button.

PICKS DATABASE TOOLS

Developers comfortable with SQL	Personal Oracle7
Seasoned xBASE developers	Visual FoxPro 3.0

FILEBOX

Personal Oracle7

Competition: Microsoft's SQL Server, Sybase's Workgroup Server, and Gupta's SQLBase, but only Personal Oracle7 lets you develop applications on the desktop and port them to any Oracle platform.

System Requirements: 386 or faster CPU (486 or faster recommended), 8MB of RAM (16MB recommended), 30MB hard disk, Windows 3.1 or higher; Version 1.20 of Win32s required to run 32-bit applications under Windows 3.1.

Bonus: Download a fully functional version of Personal Oracle7 from the World Wide Web (http://www.oracle.com/) or order a 90-day free trial on CD-ROM by calling (800) 492-9870.

$399 est. street price
Oracle Corp.
(415) 506-7000
Reader Service No. 633

Visual FoxPro 3.0

Competition: Borland's dBASE 5.0 for Windows and Computer Associates' CA-Visual Objects (for xBASE application developers) are direct competitors, but they can't match the programming ease and power of Visual FoxPro.

System Requirements: 386 or faster CPU, 8MB of RAM, 11MB of hard-disk space, Windows 3.1 or higher; Win 32s required to run 32-bit applications under Windows 3.1.

Price to be determined
Microsoft Corp.
(800) 426-9400, (206) 882-8080
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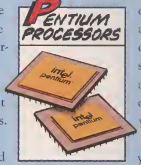

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Circle 197 on reader service card.

Take a Memo, the PC Way

Voice recognition on PCs is in its pubescent phase: old enough to show glimpses of grace and maturity, but still young enough to be awkward and in need of some guidance. IBM's new VoiceType Dictation is more proof of this.

VoiceType Dictation lets you control Windows applications using voice commands and perform free-form text dictation. The product includes the VoiceType software, a headset microphone, and a special audio adapter, which comes in ISA, Micro Channel, and PC Card configurations.

Talk Isn't Cheap A 486 system with 16MB of RAM is required to use VoiceType Dictation, but if you're serious about putting it to work, you'll want a Pentium system with 20MB of RAM. You'll also need 63MB of hard-disk space.

Don't expect to plug and play—or in this case, play and say. The software comes on 16 floppy disks, and there's no CD-ROM edition. In addition, the adapters are subject to the usual installation pitfalls. Our review product came installed on a ThinkPad portable, but even that didn't prove trouble-free. A bug in the installation routine for the PC Card version temporarily halted the software "enrollment" process; IBM has since fixed the problem.

Enrollment is the training you must complete before actually dictating to your PC, and it takes a while. You spend about two hours verbalizing 270 onscreen sentences to teach the system how you pronounce words. It's a tedious but a necessary evil. (Kurzweil's Voice for Windows is notable for requiring no training, although subsequent coaching is recommended and improves accuracy.) Unattended processing of the VoiceType enrollment took another five hours.

The training isn't really over after that, either. The corrections you make after a dictation session update your "personal language model," improving the accuracy of the system.

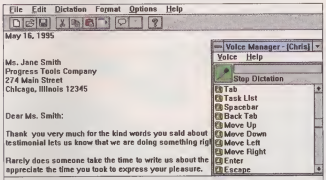
Speech Typos How accurate is VoiceType? In our initial dictation, it correctly converted 124 of 140 words in a standard business letter from the American Management Association, an accuracy rate of about 89 percent (that's one typo every ten words). Reciting the same letter several more times nudged the rate up to about 95 percent. That's not bad and would likely get better over time, but postdictation vigilance is still crucial.

VoiceType's accuracy would have improved further if there were a more direct way to redress problem words. The software consistently had trouble recognizing a few common words such as *and*, *am*, and *thanks*. Recognition improved little even after we corrected these errors several times.

Like other dictation products, VoiceType makes you speak slowly, in discrete words. But we were still able to top 60 words per minute once we got a feel for its pace. And the voice macro feature can speed things up by recalling entire phrases, sentences, or salutations with a single utterance.

While navigating is less taxing than typing, the Voice Manager feature does a good job of letting you verbally navigate around the windows and menus of many Windows applications. You can create macros here too.

VoiceType Dictation doesn't make speech recognition a snap, and the program is by no means perfect. But it works, and that's still more than a little amazing. CHRIS O'MALLEY



Now Hear This: Using the combination of voice recognition software and an audio adapter, IBM's VoiceType Dictation translates your spoken words into a written document. The dictation window includes Voice Manager, which controls the microphone and lets you move around the document.

PICKS VOICE **DICTATION** SYSTEMS

Slow start, but decent accuracy	IBM VoiceType Dictation
Instant gratification and good results	Kurzweil Voice
Works with any sound card	DragonDictate

USABILITY: *Installation can be tricky, software training and setup takes hours.* **
PERFORMANCE: *Accurate as voice recognition goes, but that's tempered praise.* ***
TECHNOLOGY: *Desktop and laptop versions are a first, but no breakthroughs in speech training techniques or tempo.* ***
VERDICT: *Not a quick fix, but a decent free-form dictation solution if you're willing to invest the time to make it work for you.* ***

FILEBOX

VoiceType Dictation

Competition: Dragon Systems' DragonDictate for Windows and Kurzweil's Voice for Windows, both of which require less up-front training and are comparably priced.

System Requirements: 486 or Pentium system with 16MB of RAM and 63MB of free disk space, external speaker or headset for playback.

$899 est. street price (ISA adapter), $1,099 (PC Card or Micro Channel adapter)
IBM
(800) 825-5263
Reader Service No. 635

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

RIGHT NOW, THERE ARE HUNDREDS OF VALUE DESKTOPS. BY THE END OF THIS AD, THERE WILL BE ONLY ONE.

LET'S START BY SAYING THAT this is unashamedly an ad for the AST® Bravo MS. And the assumption we're making is that you're currently weighing the implications of moving over to one of the new 32-bit operating systems, like Windows™95.

On the surface of it, there are hundreds of desktops to choose from.

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And how about a PCI-based graphics subsystem plus a myriad of advanced power management and security features?

Clearly the Bravo MS has all of this, or we wouldn't be mentioning them.

But there's something else we haven't mentioned: AST NetFlash BIOS. It enables you to update all your Bravo MS desktops from a central location.

AST has it, the others don't. With theirs, you'll have to reconfigure each of the computers on the network individually. And the more you have, the bigger pain it will be.

What more can we say? Except that the Bravo comes in low-profile, mid-size and mini-tower versions. And AST offers 24-hour/7-day telephone support, a 3-year limited warranty* (first year on-site) and comprehensive reseller support in the field.

Talking of resellers, you might want to call us at (800) 876-4AST for the name of the one nearest you.

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100MHz Pentium™ to 486 processors

4MB, 8MB or 16MB RAM, upgradable to 128MB

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Up to 7 drive bays and 7 expansion slots (2 PCI, 5 ISA)

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New! SOFTWARE: Peachtree First Accounting

Bean Counting for Beginners

USABILITY: *A fast, easy start for nonaccountants everywhere.* ★★★★
TECHNOLOGY: *Smart Data Entry automates data input and streamlines recurring transactions.* ★★★★★
VERDICT: *Less expensive than QuickBooks, but just as intuitive.* ★★★★★

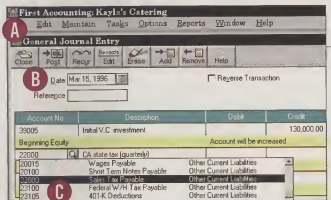
SNEAK PREVIEW

Still tackling your small-business accounting with a spreadsheet, a personal finance manager, or even worse, pen and paper? If the complexity and cost of traditional accounting software has intimidated you, Peachtree First Accounting can help.

Peachtree First's design and usability mimics its five-star elder, Peachtree Accounting 3.0 for Windows ("Book Balancing Made Better," October 1994, page 88), but is scaled back to give small-business accounting rookies a quick, easy start. And at $49 on the street, Peachtree First is roughly *half* the cost of Intuit's QuickBooks 3.0, and it includes a fully integrated payroll module (a $49 extra with QuickBooks).

The Sum Total Peachtree First offers not only the basic accounting modules—General Ledger, Accounts Payable, and Accounts Receivable—it also includes modules for Payroll Check Printing, Bank Reconciliation, Inventory Items, and Job Tracking. And in the event you outgrow Peachtree First, migrating up the Peachtree family is a cinch.

These modules offer quick invoicing, easy check printing, collection letters, commission tracking on inventory items, professional-looking financial reports, and year-end printing of 1099 tax forms, among other features. All this adds up to more accurate accounting and less time spent working on the books. The payroll check printing feature is easy to use and can help you avoid the headaches that come with manually calculating employee withholdings. As with Intuit's Quicken for Windows, the data entry screen resembles a checkbook.



A. General Journal Entry is one of several Peachtree First modules; others include Accounts Receivable, Accounts Payable, and Payroll.

B. Peachtree First gives you two **Post** options: real time, for up-to-the-minute accuracy, and batch, which lets you edit information before it's posted. Either way, correcting mistakes is simple.

C. Nothing beats Peachtree First's **Smart Data Entry** feature, which you can use to locate customers, vendors, employees, accounts, and inventory items simply by entering a few characters.

Accounting Training Wheels: Looking for a better way to balance the books? Peachtree First Accounting lets even novices run the numbers with its basic but powerful feature set and reasonable $49 price.

Make a List: After supplying details about your company, Peachtree First Accounting's smart Setup Checklist outlines the other steps you need to take to get your books in order. In-depth online tutorials will also walk you through the process.

Once you've completed one pay period for an employee, Peachtree First remembers the information so subsequent pay periods will need only minor editing. Plus, the program's Smart Data Entry saves you time in locating information about a customer, employee, or account by letting you simply enter a few characters, then filling in the rest itself.

Personal Accountant The Inventory Items and Job Tracking modules make invoicing and profit analysis faster and easier. The combination of these two modules, coupled with service- and product-based invoices, make this program an excellent solution for consultants who primarily sell time and only occasionally sell products. Job Tracking plots profit on a per-project basis and makes future project proposals easier to estimate.

Peachtree First includes 60 sample companies to choose from as a model for your bookkeeping setup, as well as a Setup Checklist to keep you on track. Peachtree also provides in-depth online tutorials that step you through the accounting choices.

The program gives you two ways to post your data: Real-time posting keeps your financial reports accurate up to the minute, while batch posting allows you the luxury of reviewing and editing all transactions before they're posted.

If you're thinking about testing the waters of accounting software, Peachtree First Accounting is a great first step. And at $49, it's a great bargain to boot. ELLEN DEPASQUALE

FILEBOX

Peachtree First Accounting

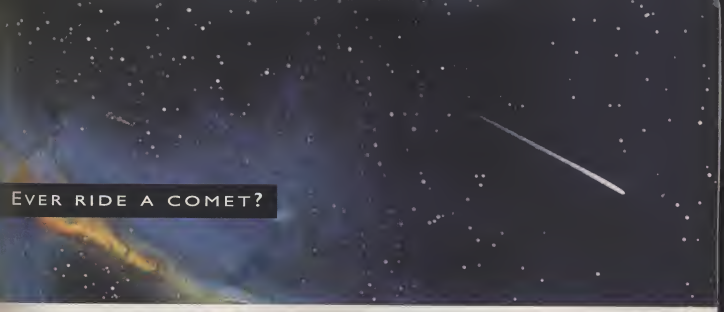
Competition: Intuit's QuickBooks 3.0, BestWare's M.Y.O.B. 5.0, and NEBS's One-Write Plus handle the same tasks, but Peachtree First Accounting is the price and usability standout.

Minimum System Requirements: 386 or faster CPU, Windows 3.1, 4MB of RAM, 12MB of free hard-disk space.

Support: 30 days free phone support.

$49 est. street price
Peachtree Software
(800) 228-0068
Reader Service No. 636

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*



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FireStorm192	1680 X 1200	192-BIT	258
Number Nine Imagine 128	1153 X 910	128-BIT	207
ATI Graphics Pro Turbo	800 X 600	64-BIT	152

*Tested in a 90MHz Pentium PCI machine at 800 x 600 x 24-bit

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The value-leading 64-bit graphics accelerator

COMPARISONS	WinBench 4.0 SCORES
FireStorm64	14.2
ATI Graphics XPression	11.3
Number Nine GXE	10.3

*Tested in a 90MHz Pentium PCI machine at 800 x 600 x 24-bit

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Circle 193 on reader service card.

New! SOFTWARE: Astound 2.0 for Windows

Keep Them on the Edge of Their Seats

USABILITY: *Basic presentation features could be easier, but the multimedia extras are straightforward.* ★★★
TECHNOLOGY: *Breaks new ground in bringing multimedia muscle to the masses.* ★★★★
VERDICT: *For creating knockout multimedia presentations, this is the one to get.* ★★★★

SNEAK PREVIEW

We all wish we could be multimedia presentation wizards. But that takes talent, specialized tools, and extensive animation know-how, right? Wrong. With Gold Disk's Astound 2.0 for Windows, neophytes and experts alike can create glitzy multimedia presentations.

Astound rests in that middle ground between high-end multimedia development tools and traditional presentation graphics programs. It ships with a full set of multimedia editors so you can create and edit animations, videos, sounds, and graphics. It also lets you easily embed animations, movies, and sounds within your presentations. Simply click on an icon, fill in a few dialog boxes, import your file, and you're set.

Presenting the Problem

If your main interest is traditional presentations and you plan to use multimedia effects only sparingly, you'd be wise to look at other programs. Astound lacks the strong charting features found in programs such as Freelance Graphics, Microsoft PowerPoint, and Harvard Graphics.

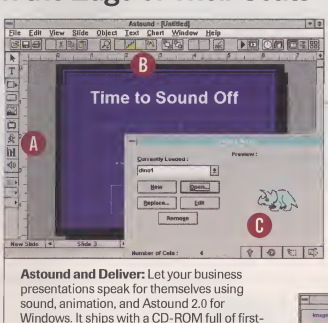
When you create a chart in Astound, you're on your own: It presents you with essentially a blank spreadsheet. There are no coaches or wizards to guide you through placing labels, values, footnotes, and other vital information. Instead, you have to click through several less-than-obvious menu choices to build the chart you want. It takes a while to get the hang of things, and even when you do, Astound's tools are a bit awkward and not as seamlessly integrated as the tools that accompany the competition.

But if all you want to do is create charts and traditional presentations, Astound isn't your product anyway. Multimedia is where this program shines. Its full set of multimedia editors have been made as simple to use as possible.

The sound editor, for example, automatically recognizes your hardware setup. To record a sound, simply click on the proper icon and go. The video editor and other tools are similarly easy to use yet offer a surprising amount of control.

Easy 3-D Not only does Astound make creating and embedding multimedia effects in your presentations a breeze, it lets you easily add special effects to traditional charts as well. For example, it's a snap to have a 3-D bar chart build itself piece by piece—far easier than with other presentation programs—and the program gives you a great deal of control over how you want to animate the charts. Astound also realizes that you won't always want to create animations and other multimedia effects from scratch, so it ships with a library of first-rate animations and prerecorded sounds.

Although Astound 2.0 for Windows doesn't offer the ease-of-use and simplicity for creating bare-bones presentations of PowerPoint, Harvard Graphics, or Freelance Graphics—we'll look for that in the next version—it's the best way to go for the easiest and snazziest multimedia presentations around. PRESTON GRALLA



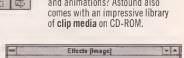
Astound and Deliver: Let your business presentations speak for themselves using sound, animation, and Astound 2.0 for Windows. It ships with a CD-ROM full of first-rate clip media, plus tools for editing your own.

Roll 'Em: Astound's video editing module offers an array of easy-to-apply special effects for enhancing video clips before dropping them into your presentation. Similar utilities for sound, graphics, and animation are also included.

A. Multimedia tools make it easy to embed animations and other special effects into your presentations—and to edit them as you drop them into place.

B. Within the program you'll also find a number of **traditional presentation features,** such as tools for building charts.

C. Rather not build your own effects and animations? Astound also comes with an impressive library of **clip media** on CD-ROM.



FILEBOX

Astound 2.0 for Windows

Competition: Freelance Graphics 2.1, Harvard Graphics 3.0 for Windows, and Microsoft PowerPoint 4.0 are easier for basic presentations, but Astound stands out for its multimedia edge.

System Requirements: 386 with 4MB of RAM, 8MB of hard-disk space, Windows 3.1, sound card; CD-ROM drive required to access clip-media disc.

$249.95 est. street price
Gold Disk
(800) 982-9888, (408) 982-0200
Reader Service No. 637

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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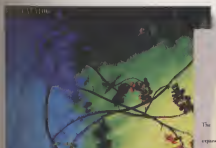

PHOTO COLOR MODE

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GRAPHIC COLOR MODE

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Circle 199 on reader service card.

New! SOFTWARE d-Time[10]

Soup up Your CD-ROM Drive

It used to be that if you wanted to point to the performance bottleneck in a PC, the hard drive was a likely suspect. Then along came CD-ROM drives, and suddenly computer users had a new definition of slow. Even a dual-speed CD-ROM drive is a mere one-tenth as fast as a hard drive at transferring data from the drive to memory.

MS-DOS's SmartDrive and other disk caches help alleviate the CD-ROM speed problem, but only barely. Fortunately Ballard Synergy came up with an ingenious device driver solution called d-Time[10].

By using a huge chunk of hard-disk space to cache data from a CD-ROM drive (you'll want at least 15MB, though we used 50MB), d-Time[10] accelerates CD-ROM performance by as much as 137 percent to near hard-disk performance.

The first time that you use d-Time[10], you may not notice any difference. That's because a cache can't do much until it becomes stored data and is requested again. d-Time[10] makes that less of a problem by creating "Timelogs" during the normal course of using a CD-ROM. The cached data in the Timelog is saved on the hard drive. d-Time[10] comes with more than 100 Timelogs already created for popular educational and games-oriented CD-ROMs.

RON WHITE

Double Time: d-Time[10] speeds CD-ROM drive performance by as much as 137 percent. It works by caching frequently accessed data from the CD to your hard drive.

USABILITY: *Easy installation and creation of Timelogs, then it's seamless.* ★★★★
PERFORMANCE: *Doubles the data-transfer speed from CD-ROMs.* ★★★★
TECHNOLOGY: *Caches data from a CD-ROM to your hard drive.* ★★★★
VERDICT: *Ideal for anyone with a large CD-ROM library, worth the hard-drive space.* ★★★★

FILEBOX

d-Time[10]

Competition: SmartDrive and other disk caches also boost CD performance, but only slightly.

System Requirements: CD-ROM drive, DOS 4.01 or later, 386 CPU or faster, at least 15MB of hard-disk space (user configurable).

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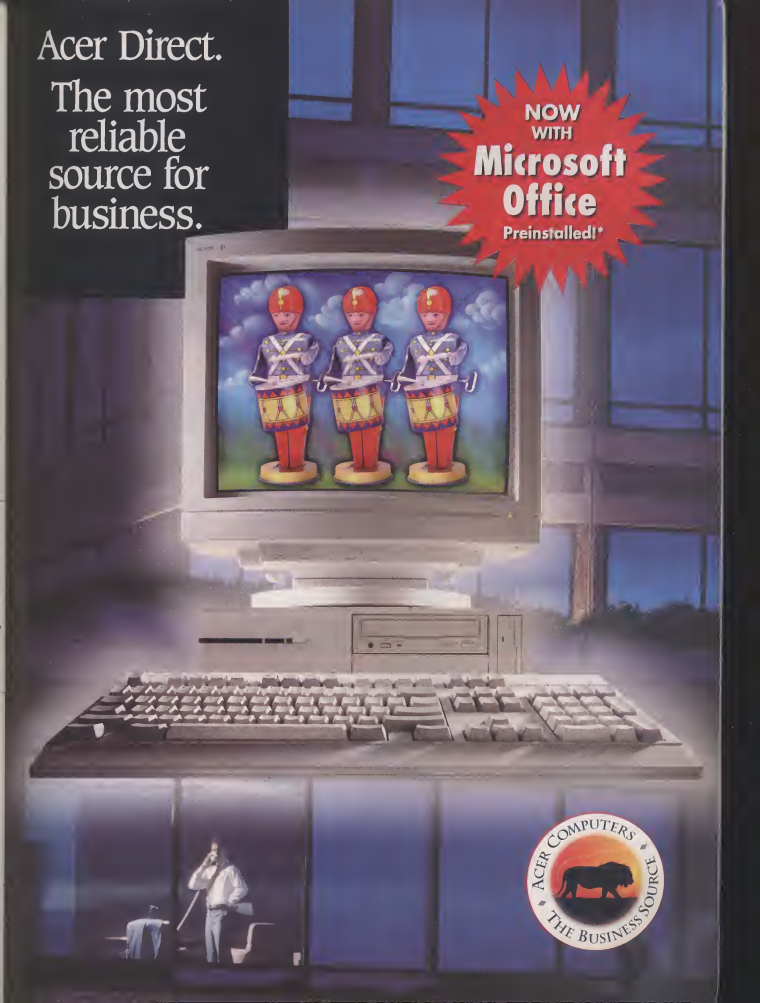
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PC World Magazine Reliability and Service Ratings

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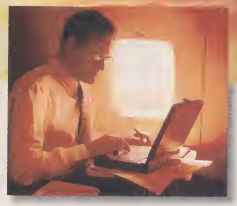

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Prices valid through May 31, 1995.

Circle 146 on reader service card.

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Smart Label software can automatically capture an address or other text and graphics from your computer screen. Print it instantly, or save it to the built-in database. It even lets you personalize labels with graphics, bar codes, digital images, and a selection of over 50 fonts. In short, this unique software makes Smart Label Printers the time-saving, hassle-free, fool-proof solution for labeling everything from envelopes to name tags, file folders to floppy disks.

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SII
Seiko Instruments

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Circle 115 on reader service card.

USABILITY: *Strong bookmarks and hotlists, exceptional history lists.* ★★★½
TECHNOLOGY: *Multithreaded downloads and instantly active windows are state of the art.* ★★★★
VERDICT: *An excellent browser—a great start for a potentially great I-Way suite.* ★★★★½

Quarterdeck Mosaic

Quarterdeck Storms the Web

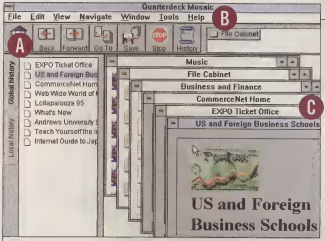
SNEAK PREVIEW

Just about everybody these days is peddling a Web browser. If you're a Windows user running a Winsock-compatible TCP/IP stack, you have dozens of freeware and commercial packages to choose from, with more arriving all the time. The latest is Quarterdeck Mosaic, a very capable browser that's the second component of Quarterdeck's suite of Internet tools known as Normandy. Eventually the suite, which should be available by June or July of this year, will include Quarterdeck Mosaic, WebAuthor (an HTML editor), news, e-mail, and other features, plus a 16-bit Web server for Windows.

Quarterdeck Mosaic distinguishes itself from other top Web browsers such as BookLink's InternetWorks, NCSA Mosaic, and Netscape Navigator thanks to its excellent history lists and annotation features. It's also the first to include a thorough tutorial for understanding and writing HTML code—a must for publishing documents on the Web.

Windows on the World

Like InternetWorks, Quarterdeck Mosaic calls up Web pages in individual windows. Click on a hyperlink within a Web page, and the program loads that page in the current window. Double-click on a Web address from one of Quarterdeck Mosaic's history lists or its File Cabinet, and you open a fresh window, preserving any existing windows as distinct Web sessions. Back and Forward navigation keys operate independently in each window.



A. Global history lists track all your Web searches; individual searches have their own Local history lists.

B. The File Cabinet acts as a bookmarking feature for stashing links to frequently visited Web sites.

C. Double-clicking on a Web address in a history list or the File Cabinet opens a fresh **search window.**

Fantastic Voyage: Quarterdeck Mosaic, the first piece of Quarterdeck's Internet suite, lets you navigate the World Wide Web in style. Multiple windows and Global history lists keep your searches on track, plus each window has its own Local history list should you suddenly need to backtrack.

Post-it Notes: Make notes about the Web pages you visit and find them again easily using Quarterdeck Mosaic's annotation feature. Simply double-click in the annotation strip along the side of any loaded Web page to create a note; your comments will then appear on a scrap of yellow note paper pasted onto that page.

Quarterdeck Mosaic's greatest strength is its navigation tools. You can activate the history list of a recently visited site at any time, placing it at the left side of the screen, and you have on-demand access to the well-designed File Cabinet. This feature replaces the bookmark or hotlist in other browsers and resembles the excellent tab system of InternetWorks and SuperHighway Access.

Quarterdeck Mosaic's annotations feature is a vast improvement over what's offered in most other browsers. Down the right side of each loaded Web page is an annotation strip. When you move the cursor into that strip, it changes to a pen-and-paper icon. Double-click and a box opens in which you can type whatever you wish. Next time you visit that page, click on the annotation icon, and you'll see the annotation as a piece of yellow note paper.

Success Story Although the e-mail and news readers weren't in place during the testing of our beta, the description provided by Quarterdeck suggests that they'll do nothing to detract from the program's success. If Quarterdeck Mosaic is any indication, Normandy promises to be a very good, very complete suite of tools for the Web. NEIL RANDALL

FILEBOX

Quarterdeck Mosaic

Competition: BookLink's InternetWorks, Netscape Navigator, NCSA Mosaic.

Notable Features: Multithreaded downloads, history lists, HTML viewer, built-in graphics viewer, e-mail and news readers.

Free Trial: http://www.qdeck.com/

Price to be announced
Quarterdeck
(800) 354-2283A, (310) 392-9851
Reader Service No. 640

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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(1) Winbench 4.0 score based on in-house testing of a 2 MB MGA Impression Plus PCI board using a Compaq ProLiant 2L, Pentium®/5-90 16 MB RAM, 512KB cache at 1024 x 768 x 256 colors, 72Hz
(2) Hardware video acceleration currently available with MGA Impression Plus
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"It's the MGA Impression Plus' combination of sophistication and down-to-earth street price that wins it our MVP Award this year."
PC Computing, Dec. 1994, p. 140

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Circle 155 on reader service card.

matrox

Logbook LONG-TERM TESTS:
Pocket Quicken • Approach 3.0

Put an Accountant In Your Pocket

I have two applications on my desktop that I open every day and can't live without: Netscape Navigator (the best darn Web browser on Earth) and Intuit's Quicken 4.0 for Windows (the best darn personal finance manager ever). Quicken is a gem. It saves time and money, it's easy to use, and the CD-ROM version includes the Wall Street Journal Personal Finance Library. No wonder Bill Gates bought the company.

So what could be better than Quicken on my desktop? Quicken in my pocket, of course. Now one of my favorite applications is portable! I've used Pocket Quicken on my Hewlett-Packard 200LX and my Sony Magic Link, and I've even tried the version for Apple's Newton MessagePad 120 and love it. I don't spend money at my desktop—I spend money when I'm out and about. Pocket Quicken gives me an instant, automatic entry point for cash transactions when I'm reaching for my wallet. And with Pocket Quicken Connect, I can link and sync my pocket version to my desktop version anytime I'm in the office.

Pocket Quicken is ideal for business trips. I track transactions as they occur, then connect my PDA of choice to my desktop when I return. I also get the same basic checking, credit card, and cash account tracking that I use with Quicken on my desktop. Even better, Quicken lets me easily export my financial data into Portable Software's QuickXpense (see "An Easy Way to Tally Expenses," March, page 90).

I like the Pocket Quicken interface for all three platforms, especially the Magic Cap version on my Magic Link: It looks exactly like my desktop version—same checkbook register metaphor. What better way to pinch pennies than while I'm spending them? **RICH SCHWERIN**

Pocket Quicken / Intuit / (800) 624-8742, (415) 322-0573 / Bundled with Apple, Sony, and Hewlett-Packard PDAs / *Reader Service No. 641*

Logbook Entries:

August 26, 1994: *My Hewlett-Packard 200LX is a great little PDA that comes with a built-in version of Pocket Quicken. I track each check, cash, and credit transaction electronically as it occurs.*

December 6, 1994: *I finally get my hands on Sony's Magic Link PDA and start using SmartWallet (Pocket Quicken for Magic Link). I enter my credit card information, checking account data, and a double-secret password.*

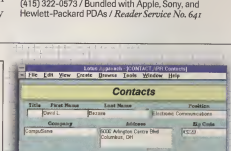
February 20, 1995: *Good news! Apple's newest Newton, the MessagePad 120, includes Pocket Quicken. Too bad linking and synching it to my Windows PC using Apple's Newton Connection Kit for Windows requires such patience. Connecting the Sony Magic Link to my PC is much easier.*

Logbook Entries:

October 10, 1994: *At address entry number 2,862 Lotus's Organizer runs out of gas. I can't query the information the way I'd like and creating custom reports is next to impossible. Time to move up to Approach 3.0. I copy my Organizer files to .DBF files and import them into Approach.*

January 20, 1994: *After more than 3,500 address entries, queries are still snappy.*

February 2, 1995: *I need to rearrange the interface to the contacts database. What's the difference between Arrange and Align? Nothing in Help clues me in, but Arrange does the trick.*



Approaching the PIM-to-Database Shuffle

You start a new job, and your boss wants you to keep track of a few things: staff, customers, prospects, competitors, competitors' products, your products, new technologies. . . . Are you writing all this down? PIMs and contact managers are great, but at some point they max out. Time to think about switching to a database.

It was a challenge for me to find a program that works like a database but is as accessible and convenient as a PIM. Then I tried Lotus's Approach 3.0. This program stores data in rows and tables that look like a spreadsheet. Click on the Design command for the interface, and up pops a screen that's no more challenging than a basic page layout program. All told, Approach is a lot more accessible than the blank screens you'll find in traditional databases, including FoxPro.

But some features need work. For example, even using the Select All command, I can't consistently change all the fonts and styles on the label headings at the same time. Also, sometimes when the screen is refreshing the hourglass doesn't pop up. And Approach doesn't have the speed of a Formula 1 database like FoxPro. But as an industrial-strength PIM, it's strong and intuitive enough. **HOWARD BALDWIN**

Approach 3.0 / Lotus Development / (415) 335-2200 / $80 est. street price / *Reader Service No. 642*

Experience the ultimate in multimedia . . . the **ViewSonic 15GA** and **17GA PerfectSound™** multimedia monitors. Be prepared for a blast of sight and sound that engulfs you with rich, lifelike tones, directed towards YOU. Plus, since you don't need separate speakers, you'll save valuable desk space.

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In addition to the terrific sound, these new 15" and 17" CRTs (14.0" and 16.0" diagonal viewable areas respectively) both feature a Super Contrast screen, 0.27mm dot pitch, resolutions up to 1,280 x 1,024 and an ultra high refresh rate of 86Hz at 1,024 x 768. You'll be proud of the beautiful, brilliant, photo-quality screen images. Our OnView™ controls allow you to make image ***and*** audio adjustments right on the screen. Plus these monitors are *Plug & Play +** for Windows'95, which automatically provide the utmost in screen image capabilities.

In keeping with today's concerns for radiation, safety and the environment, these monitors not only exceed MPRII and EPA Energy Star requirements, but have also adopted the most stringent Swedish TCO standards for reduction of heat emissions and exposure to electromagnetic fields.

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*Requires a DDC compatible video card
All products and trademarks are brand names of their respective companies
Specifications subject to change without notice

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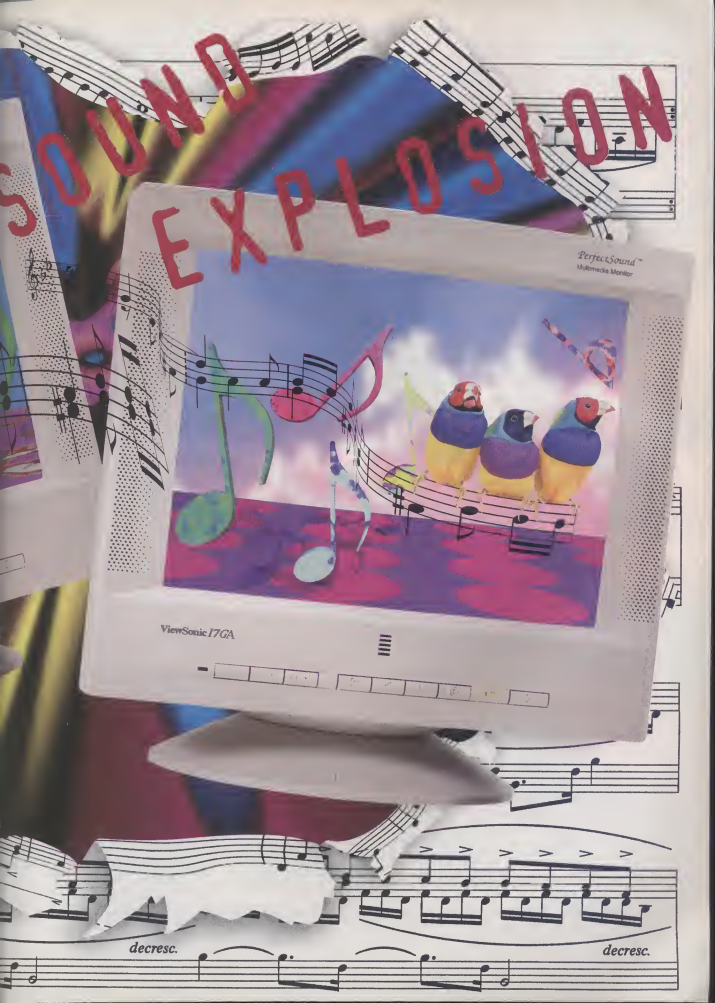
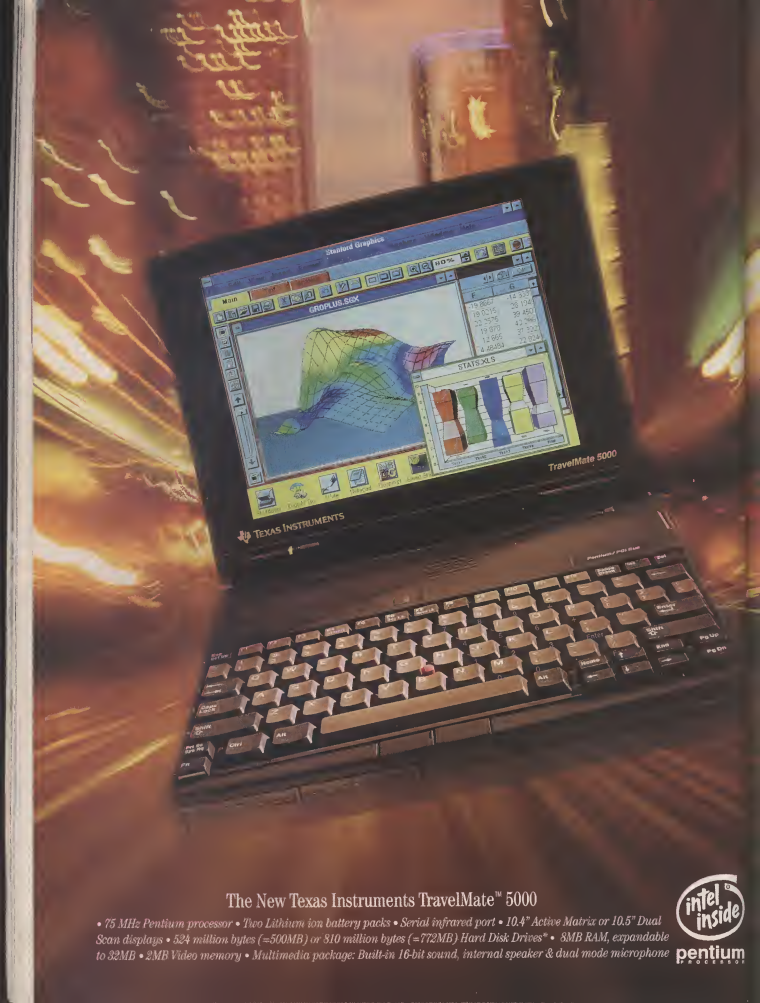

SOUND
EXPLOSION
PerfectSound™
Multimedia Monitor
ViewSonic 17GA
decresc.
decresc.



The New Texas Instruments TravelMate™ 5000

• 75 MHz Pentium processor • Two Lithium ion battery packs • Serial infrared port • 10.4" Active Matrix or 10.5" Dual Scan displays • 524 million bytes (=500MB) or 810 million bytes (=772MB) Hard Disk Drives • *8MB RAM, expandable to 32MB • 2MB Video memory • Multimedia package: Built-in 16-bit sound, internal speaker & dual mode microphone*

intel inside pentium processor

Introducing The First Notebook To Maximize The Pentium's Full Potential.

When the rush was on to introduce a notebook with a Pentium™ processor, Texas Instruments decided to do what others thought couldn't be done.

We created a notebook that maximizes Pentium performance by integrating *full PCI bus architecture in our TravelMate 5000.*

And for flexible connectivity, we designed a way to allow external access from the PCI bus to the latest peripherals.

It was a challenge we addressed for two simple reasons: to give users true desktop Pentium performance for *faster running software and expansion capabilities* for investment protection.

So now you have a notebook with smoother full-motion video and enhanced 3-D graphics. In addition, we designed the TravelMate 5000 to take advantage of the "plug and play" capabilities of Windows 95® when it becomes available.

But our engineers didn't stop there. *We added a second lithium ion battery* without sacrificing size, weight or eliminating a floppy drive.

In addition, wireless communication with other notebooks and desktops is very quick and easy with our integrated infrared capabilities.

The TI TravelMate 5000. For more information on what others thought you couldn't do with a notebook, simply call 1-800-TI-TEXAS (e-mail: 2ti@msg.ti.com).

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Warranty may vary from country to country. Contact your local TI office for details. Batteries and options are covered by a one year limited warranty. *Depending on model. TravelMate and "Extending Your Reach" are trademarks of Texas Instruments. Windows 95 is a registered trademark of Microsoft Corporation. Pentium is a trademark and the Intel Inside logo is a registered trademark of Intel Corporation. © 1996 TI

Circle 163 on reader service card.

Getting Your Message Across on Paper, in Person, or Electronically

Maximum Impact

SYNOPSIS

HOW MUCH? *Find out just what you're going to spend.* **116**

HARD COPY: *For lots of information and a big audience, put your ideas into print.* **118**

STAND AND DELIVER: *Three high-tech solutions to make your audience really listen.* **120**

GET WIRED: *20 million Internet users could visit your own World Wide Web page.* **126**

FINAL ANALYSIS: *Which solution (or solutions) is right for you?* **130**

SLICK STUFF: *Other handy tools for presenting information.* **132**

A brilliant idea won't get you anywhere until you've communicated it to the right audience and convinced them of its brilliance. What's the best way to do it? The possibilities are nearly limitless, and even if the content is the same, each method says something different. What sort of impression will your idea make on today's high-tech audiences if you deliver photocopies of a typewritten document? Probably not a very good one. Try using desktop publishing to spruce up that message—you'll enhance the look and grab your audience's attention. Make it into a multimedia presentation and you'll be conveying your savvy. Turn it into a home page on the World Wide Web and you'll show that your company is on the cutting-edge of technology.

To help you choose how to present your ideas, we carefully inspected hundreds of individual products to find the best complete solutions for making an idea presentable: desktop publishing, performing a stand-up presentation, and creating a World Wide Web page. Because one size doesn't fit all, we reviewed bargain solutions, usability-oriented solutions, and super–high-end solutions within each type of presentation.

Desktop publishing is great when you have a lot of information to convey. It's not glamorous, however. Imagine standing before the board of directors and asking them to spend time studying a dense report. Now imagine using the same desktop publishing package to update your résumé.

To solve this specific problem, there are presentation tools. But presentations go out to a limited audience—those in the room.

And that's why we are also showing you tools to create a World Wide Web page. Here you combine some of the advantages of desktop publishing with those of a stand-up presentation. The drawback? Your audience needs to be on the Internet.

Remember: The message is only as good as the medium.

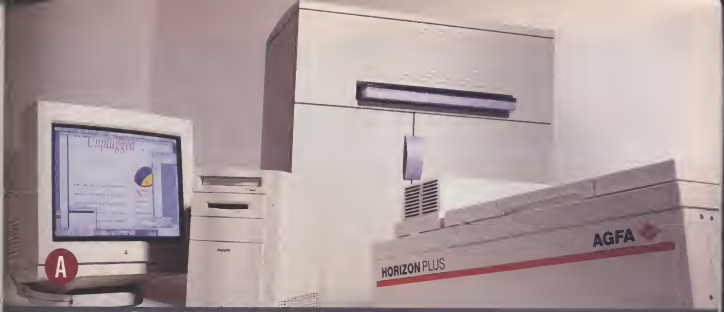
BY JOHN MONTGOMERY

A DESKTOP PUBLISHING: If you want an easy way to make an idea look great, turn to a desktop publishing solution. It's perfect for conveying lots of information to many people.

B PRESENTATION: For the board of directors, you probably want something engaging—maybe even something interactive.

C THE INTERNET: And for the online addicts in your audience, you'll want a home page on the World Wide Web. The tools to create one are actually inexpensive and simple.

PHOTOGRAPHS BY ERNIE FRIEDLANDER



Choose the right system to present your message . . .

. . . on **paper,** in a live **presentation,** or on the **Internet.**

Spotlight on Cost

You just laid out cold, hard cash for hardware and software. But that's just the first payment in your installment plan.

How much do you want to spend? It depends on how heavily you use your setup, and what method you've chosen. With desktop publishing, you'll start by looking at **paper**, then **ink and toner** costs. After that, you have reproduction and possibly mailing expenses.

Budgeting the costs of a live presentation? Factor in the cost of the presenter's time and **transportation** to the site. If, for example, you need to give a demonstration somewhere across the country, you could be looking at more than $1,000 in plane fare alone.

You might think that a home page on the World Wide Web would be a simple solution. Up front, it can be. But then you could be renting space and time on someone's Web server. Or paying for a direct connection to the Internet. **Connection charges** can run up to thousands of dollars a month.

The table below details some of the costs of creating a presentation using each of these three methods.

The **Penny** Patrol

Paper: No matter what DTP solution you choose, paper will probably be involved. Some paper is relatively inexpensive. Some runs to $5 a page. Granted, that's less expensive than an $80 match print (a photographic film proof that comes from a printing house), but it adds up quickly.

Ink and Toner: Dye sublimation and thermal wax-transfer printers use expensive ink that sends the cost of printing a page skyrocketing. Ink jet technology is much less expensive, but surprisingly, color laser printers do very well in this arena.

Transportation: If you plan to create a presentation and take it on the road, you're looking at plane fare, hotels, local transportation, and eating out—plus the time invested in giving the presentation.

Connection Charges. If you decide to go online to escape consumable and transportation costs, look at your connection charges. What does it cost you to maintain a fractional T1 for your Internet connection? What is your service bureau charging to store your home page?

Bargain Desktop Publishing

Associated Costs:

Hardware Purchase Price: *$4,247*

Software Purchase Price: *$1,043*

Total 3-Year Cost: $6,000

Includes printer and consumables, plus mailing (which varies depending on the size of the document and the number of copies), plus service bureau or commercial printer costs.

General Comments:

The biggest chunk of change will be your service bureau, which will charge you for proofs, ink, paper, and labor.

Bargain Presentation

Associated Costs:

Hardware Purchase Price: *$2,994*

Software Purchase Price: *$395*

Total 3-Year Cost: $4,000

Includes printing and consumables, plus another $500 in photocopier consumables. Add in the cost of sending someone to give the presentation, and factor in the cost of their lost time.

General Comments:

This is the most labor-intensive solution because someone has to deliver the presentation in person.

Bargain Home Page

Associated Costs

Hardware Purchase Price: *$2,395*

Software Purchase Price: *$0*

Service Provider Charges: *$4,000 per quarter*

Total 3-Year Cost: $50,395

General Comments:

Those monthly or quarterly costs for having someone host your Web page really add up fast. Aside from that, the bargain solution is quite inexpensive. And if you're in it for three years, you might find it cheaper to set up your own Web server.

NEW QUATTRO PRO 6.0 FOR WINDOWS

Why is it there's never been a spreadsheet that works like WordPerfect?

All-new Quattro® Pro 6.0. Designed to work with numbers. Designed to work with WordPerfect.®

It's a question millions have asked. "Which spreadsheet works best with WordPerfect?" The answer—new Quattro Pro.

Look at the menus and toolbars. They're the same as in WordPerfect. Dialog boxes (like "File Open") are the same, too. And thanks to PerfectFit™ Technology, even automation tools like Experts and Coaches™ are the same. It's just like using one program.

But the best part is this. The programs are built to work together. You can simply drag a Quattro Pro spreadsheet and drop it into a WordPerfect document. Then edit it right there—without switching applications. You can't do that with 1-2-3.®

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Only Quattro Pro gives you the perfect combination of spreadsheet power and stunning graphics. Plus the same world-class, toll-free support as WordPerfect.®

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Easy Hard Copy

Desktop publishing is ideal when you need only a one-way communication channel, when you have a lot of information to convey, or when you have a huge audience. It's getting increasingly easy to generate professional-looking books, newsletters, and manuals without paying a professional designer. With very little money, you can create an information-dense document that people will find attractive and want to read. What more could you ask for? How about interactivity? Or for lower printing and mailing costs? Desktop publishing saves you money over hiring an outside firm to create and mail documents for you, but you'll probably still need the services of a production facility to actually print your document. That can become costly pretty quickly.

PICKS THE DTP EDGE

1 Choose the result you want.	2 What's more important to you?	3 The best solution for your needs is . . .
Newsletter	Usability	Usability Solution
	Price	Bargain Solution
Manual	Power	High-End Solution
	Price	Usability Solution
Four-Color Publication	Power	High-End Solution
	Price	Usability Solution

BARGAIN SOLUTION

Starting Out Simple

If you need to do desktop publishing only occasionally, or you don't need to create much more than simple manuals and newsletters, you'll find entry is actually quite inexpensive. Our complete package came to only $5,290, and has nearly every component found on our high-end system, but in a less-powerful version.

Our solution utilizes three pieces of hardware: Quantex's 90MHz Pentium-based QP5/90, plus Envisions' ENV6600S scanner and Hewlett-Packard's DeskJet 560C. We spent $3,049 on a fast system because page layout and photo editing programs are so resource-hungry. The scanner and printer each ring in at $599—very inexpensive, but capable of delivering reasonable quality.

PC/C Unplugged

The centerpiece of any desktop publishing solution is the page layout program. We chose the CD-ROM edition of Microsoft's Publisher 2.0, which provides the functions that simple page layout requires for only $199. After page layout, you need a photo editing package—and at $595, Micrografx's Picture Publisher 2.0 is one of the least expensive products we could find that performs professional-quality photo editing. Finally, you'll need a drawing package. We chose ShapeWare's Visio 3.0 not only because it's inexpensive at $249, but because it's so easy to use.

This solution is not complete—for example, it lacks a combination paint and draw package—and the quality of the DeskJet 560C's output isn't high enough to let you do page proofs (you'll need to get match prints from a professional printer at about $80 per page), but it's good enough for spot color and business graphics.

SUITABILITY: *Fine for light publishing.*
VERDICT: *This solution will get you started, but the hardware will prove inadequate for very complex documents.*

SUMMARY

Pros: A complete solution; inexpensive.

Cons: Lacks sophisticated page layout and painting capabilities; you'll need the services of a production house for best results.

$5,290

USABILITY SOLUTION

Powerful but Simple

SUITABILITY: *A good, professional solution.*
VERDICT: *Although you'll find you're still spending money on match prints, you'll be able to do most things in house.*

If you're interested in getting really professional results with minimal hassle, consider the components in our usability solution. We ran usability inspections of software packages for page layout, photo editing, and painting/drawing to determine which provided the most power for the least sweat. Also, knowing how underpowered hardware can make even the most usable software unusable, we chose a faster system to anchor this solution.

PC/C Unplugged

The system in question is Polywell's 100MHz Pentium-based Poly Dual 5100 EP2 with a whopping 128MB of RAM for fast photo editing. This $9,995 system outperformed the others we tested for this feature, and made light work of photo editing tasks. For a scanner, we chose Microtek's $849 ScanMaker III IR, and for a printer, we selected Fargo Electronics' dual-function (dye sublimation/thermal wax-transfer) PrimeraPro for $1,500. This printer yields fairly clear results (especially in dye-sub mode), but it is slow to print high-resolution images.

Usability inspections revealed that the triumvirate of Adobe's $895 PageMaker 5.0 and $895 Photoshop 3.0, plus Corel's $695 CorelDraw 5, is incredibly powerful and highly usable. We also included ShapeWare's $249 Visio 3.0 (which tied with CorelDraw for ease of use) for those quick-and-dirty graphics we all need.

SUMMARY

Pros: Good price for the power; easy to use.

Cons: You'll still send files to a production house for proofing and final printing The dye-sublimation printer is slow.

$15,078

With a good-quality dye-sublimation printer paired with serious page layout software, this complete package could easily slide into any office and get pages ready for a professional printer. It's still not quite ready to generate in-house page proofs, but otherwise, it's $15,078 well spent.

HIGH-END SOLUTION

For Professionals Only

SUITABILITY: *The perfect pro solution.*
VERDICT: *Yes, it's pricey for a single-user desktop publishing station. But you'll save in the long run by reducing match prints.*

The staff of *PC Computing*'s art department huddled around this setup, making impressed sounds. For $70,209, they should darn well be impressed. We bundled some of the best desktop publishing components there are into this solution.

But we didn't use a PC. The computer in this one is a $13,531 Power Macintosh 8100/110 from Apple Computer with 128MB of RAM. Sacrilege for a PC magazine? Perhaps. But the very high end of desktop publishing is still dominated by the Macintosh. And that's hardly the end of it. We included an incredible $19,995 Horizon Plus scanner from Agfa graced with a clarity that has to be seen to be believed.

PC/C Unplugged

For match-print quality output, we selected Iris Graphics' $33,500 SmartJet 4012 printer—an ink jet capable of realizing resolutions up to 1,800 dpi in four colors. This printer is unlike any other we've looked at. When it starts printing, it spews all four colors continuously, deflecting those that aren't needed with an electromagnetic field. Its main drawback is that it requires daily maintenance.

Then we piled on the software: Quark's QuarkXPress 3.2 ($995), Adobe's Photoshop 3.0 ($895) and Illustrator 5.5 for Macintosh ($595), Fractal Design's Painter 3.0 ($499), and Kai's Power Tools for Photoshop 2.1 ($199). There isn't much in the way of desktop publishing

SUMMARY

Pros: A lust-inducing combination of hardware and software for any pro.

Cons: The price tag is eye-popping but you'll be ready to cut ties to all production houses.

$70,209

that this system isn't capable of. All you need now is your own printing press and a huge stack of paper, and you'll be ready to cut all ties to production houses.

To get our art department to drool, you have to be good. This solution isn't just good: It's probably the best you can get.

Stand and Deliver

Lock a bunch of people in a room with coffee. That's when a presentation is most effective (at least, that's what traditional wisdom says). Good presentation tools will help you organize your thoughts into a powerful, succinct message. When you give an audience hard-copy printouts of your slides, you're providing an outline that helps people follow what you're saying. When you add multimedia to the slides, you can create images that stick in an audience's minds for months. Presentation becomes a less effective tool, however, when you can't collar all the people you need in one place at one time. Handouts of your slides just can't deliver the same oomph as your live show, unless you specifically design them with absent audience members in mind.

PICKS THE **PRESENTATION** EDGE

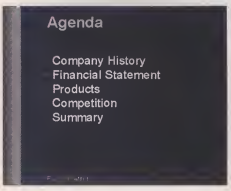
1 Describe your audience.	2 What's more important to you?	3 The best solution for your needs is . . .
Intimate Group	Price	Bargain Solution
	Dazzle	High-End Solution
Very Large Audience	Price	Usability Solution
	Dazzle	High-End Solution
The Brass	Price	Bargain Solution
	Dazzle	High-End Solution

BARGAIN SOLUTION

Bare Minimum

You don't need much to create a presentation: A computer, presentation package, and printer will do just fine. Create your presentation, print it out, and photocopy it. Of course, you risk putting your audience to sleep, but if you're on a tight budget it will get you started.

Just about any computer is capable of handling today's presentation graphics packages. We chose the Pantera 486DX2/66 from Zeos with 16MB of RAM for our base system. At $2,395, it's fairly inexpensive and can serve just about any need. We then tacked on HP's $599 DeskJet 560C to give you color printouts. In addition to decent-quality paper output, the DeskJet 560C has the advantage of being able to print rather nice transparencies, so you'll have something to project onto the wall, too. Make sure you use a color photocopier to reproduce your presentation—it will need every bit of pizzazz it can get. For presentation graphics software, we chose Software Publishing Corp.'s Harvard Graphics 3.0 for Windows: It's not overly expensive at $395, and it's very usable. You may also want to invest in your own overhead projector if you decide to go with this solution.



SUITABILITY: *Gets the job done.*
VERDICT: *If you choose this solution, you probably choose airlines that offer a discount if you ride with the luggage.*

SUMMARY

Pros: Inexpensive; capable of color printouts and transparencies.

Cons: Output quality is reasonable, but not great. It's a bare-bones, no frills proposition.

$3,389

You shouldn't expect brilliant results from the presentation you generate with this package, so plan to bring some interesting props and a few good jokes to keep things moving. The complete bargain solution we put together came to a paltry $3,389.

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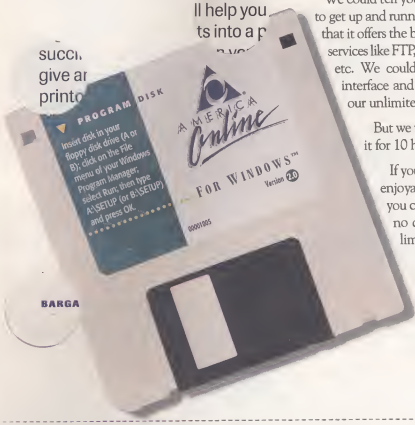

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-PC Magazine, Editors' Choice, February 21, 199

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-PC Computing Magazine, September 1994

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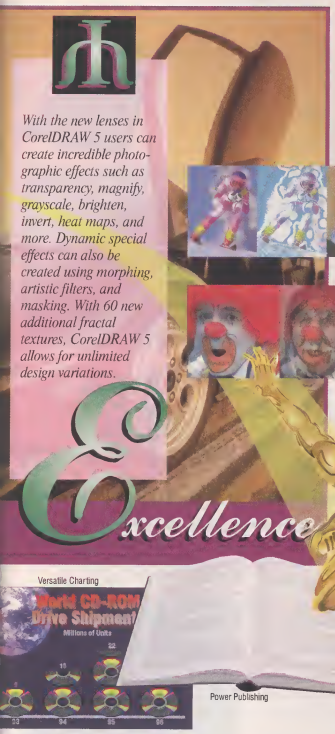

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InfoWorld, August 1994-USA

"OUTSTANDING! CorelDRAW 5 really is the best graphics package ever!"
PC Answers, June 1994-U.K

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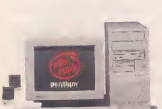

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- Mouse • Keyboard #656332

(Monitor sold separately)
Compudyne 14" 28 M Monitor #289681 $239.99

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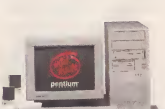
Business lease only '63/mo.▲



COMPUDYNE. 90 MHz Pentium™ Processor Minitower Computer

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- Mouse • Keyboard #656354

(Monitor sold separately)
Compudyne 15" 28 M Monitor #289690 $299.99

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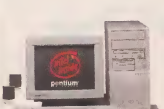

COMPUDYNE. 100 MHz Pentium™ Processor Minitower Computer

- 16 MB RAM • 1.2 GB HD • 2 MB PCI video card • Quad-Speed CD-ROM Drive • DOS/Windows
- Mouse • Keyboard #656321

(Monitor sold separately)
Compudyne 17" 28 M Monitor #588171 $649.99

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Business lease only '93/mo.▲

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- 8 MB RAM • 540 MB HD
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- MS DOS & Windows Versa P #669972

$4999.99

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PC Accessories 2 Pack Surge Protector
Limit 5 per customer

$9.99

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Hewlett-Packard Hi-Capacity Black Ink Cartridge
Limit 4 per customer

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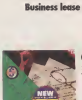
#481661



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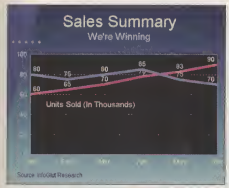
Circle 190 on reader service card.

USABILITY SOLUTION

Sliding Right Along

SUITABILITY: *Transportable, scalable, usable.*
VERDICT: *If you're traveling and don't know whether your audience is going to be 1 person or 1,000, choose this.*

To put together a usable solution to create a presentation, you don't need much—a computer, good presentation software, and a printer. To create a usable solution to present the presentation is a different matter. The truth of the matter is that transporting and setting up sophisticated presentation equipment can drastically decrease the usability of any solution. So, the most usable solution is to print overhead transparencies or to make slides and bring those.



The hardware we chose lets you create a great-looking presentation you can give to 2 people or 2,000. It starts with a $3,049 QP5/90 from Quantex. Add HP's $599 DeskJet 560C to print both paper and transparencies. Finally, tack on the $5,995 Turbo PC film recorder from Mirus Industries. This clever device lets you create 35mm slides directly from your PC. The Turbo PC creates film negatives that you'll need to develop. You can either drop by the nearest drug store and get two-hour service, or invest $550 in your own film developer, such as Jobo's CPE2. The CPE2 sits on your desk and actually develops film while you wait.

SUMMARY

Pros: Works with any size audience; extremely portable and easy to use.

Cons: Today's audiences tend to expect more flourish.

$11,532 with Harvard Graphics, $11,632 with PowerPoint

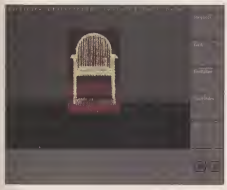
On the software side, our usability inspections determined that you'd do well with either Microsoft's PowerPoint 4.0 ($495) or SPC's Harvard Graphics 3.0 ($395). Tack on ShapeWare's Visio 3.0 ($249) and Corel's CorelDraw 5.0 ($695) for great graphics, and you'll be rocking.

HIGH-END SOLUTION

Massive Multimedia

SUITABILITY: *Practical and partially portable.*
VERDICT: *This is the ultimate presentation system, although it may be more than you want to haul around.*

High-tech presentations grab an audience the same way a good movie does. The idea is to complement what you're saying with data cleverly disguised as entertainment. For that, you need something a little more lively than a slide-by-slide presentation. It's time to have some fun: Assume you have an unlimited budget and a corps of people to carry around all the different presentation equipment you'll use, then see what you can get.



Let's start with Dell's $4,849 Dimension XPS P90, and the DeskJet 560C and ScanJet IIcx ($1,179) both from HP. That's your base system. You'll want to make slides, too, so add the $5,995 Turbo PC film recorder from Mirus Industries and the CPE2 film developer from Jobo ($550). To take your presentation on the road, drop in Toshiba's $4,899 T2150CDT multimedia notebook computer. Now add Boxlight's $7,299 ProColor 2101V LCD projection system—a panel and a light all in one box.

For software, start with Microsoft's $495 PowerPoint 4.0. Add Visio 3.0 ($249) and CorelDraw 5 ($695) to create graphics. Now add Macromedia's Director 4.0 ($1,195) to create a truly sophisticated multimedia production system. Then drop in a copy of Caligari's $795 trueSpace 2.0 to do interesting animations in 3-D.

SUMMARY

Pros: Will capture even the most jaded audience's imagination; works with an audience of any size.

Cons: Expensive; too many components for easy transportation.

$12,200

Now break out your purchase order. But before you do that, break out into a sweat. At nearly $30,000, this isn't petty cash.

The Internet: Reach 20 Million Computer Users

Getting Wired

A home page on the Internet's World Wide Web is a great tool for reaching potential customers. It has the advantage of being available 24 hours a day, seven days a week, and it organizes information at a variety of depths: Your home page can provide highlights, and subsequent links can delve into excruciating detail. In short, you can give your customers as much information as they want. First, of course, these customers need access to the Web, just as they must subscribe to a particular print publication if you decide to advertise there.

Second, you'll need to gain some expertise in designing a home page. Finally, you'll have ongoing maintenance costs, whether you decide to rent space from a service provider or set up your own server.

PICKS THE **INTERACTIVE** EDGE

1 Choose the kind of home page you want.	2 What's more important to you?	3 The best solution for your needs is . . .
Simple, Low Traffic	Price	Budget Solution
	Usability	Usability Solution
Complex, Low Traffic	Price	Usability Solution
	Power	High-End Solution
Complex, High Traffic	Power	High-End Solution
	Usability	Usability Solution

BARGAIN SOLUTION

Cheap and Easy

In order to set up a Web page, you need two things: a computer set up to create hypertext markup language (HTML) documents and a server on the Web. The former is pretty simple—a PC and some software. The latter can become very complicated, but initially, it will be most cost-effective to rent time and space from a service provider. You send your HTML pages to the service provider, which will take care of all the miscellany that would require you to hire a full-time Web administrator.

We got a copy of Mosaic (available on PC Contact, data library 6, Communications & Networks as MOS1.ZIP) and selected CU_HTML and HTML Assistant 1.0a as our HTML editors. The former is a template for Microsoft's Word for Windows. It lacks the more sophisticated HTML editing power that you'll find in HTML Assistant. The PC that you'll need to create an HTML document doesn't need to be very powerful. We chose a $2,395 Pantera 486DX2/66 from Zeos.

Next, we contacted what's called a co-hoster—a site that would post our Web pages for us—and discussed the pricing for posting our page. The company, Electric Press, said that the smallest amount it would handle would be 25 pages (the definition of a page in Web terms is a little amorphous), which they would help us design, and that they would charge us $4,000 per quarter to post.

File Edit View Go Bookmarks Options Directory

Guided Tour | What's New | Questions | Net Search | Net Directory | Newsgroups

Presenting

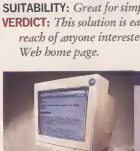
The Internet: Reach 20 million computer users almost effortlessly

Getting Wired

A home page on the Internet's World-Wide Web is a great tool for reaching potential customers. It has the advantage of being available hours a day, seven days a week, and organizing information at a variety of depths: Your home page can provide highlights, and subsequent links can provide excruciating detail. In short, you can give your customers as much information as they want.

Of course, these customers have to have access to the Web, just as they must subscribe to a particular magazine if you decide to advertise there. Second, you'll need to gain some expertise in designing a home page: Plain text doesn't cut it anymore - you're going to need

SUITABILITY: *Great for simple Web pages.*
VERDICT: *This solution is easily within the reach of anyone interested in creating a Web home page.*



SUMMARY

Pros: Easy to use; low initial costs.

Cons: Not capable of creating very complex pages; quarterly service charges nearly twice hardware costs.

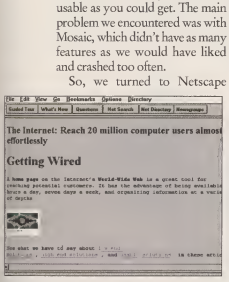
$2,395 plus $4,000 per quarter for 25 pages

USABILITY SOLUTION

With a Few Additions

We gave our bargain solution the once-over from a usability standpoint and came to a wonderful conclusion: It was just about as usable as you could get. The main problem we encountered was with Mosaic, which didn't have as many features as we would have liked and crashed too often.

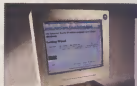
So, we turned to Netscape Communications and purchased a $99 copy of Netscape 1.0, a much better, faster browser. Netscape boosts performance by reading in graphics at the same time as text. After that, we kept the same hardware (Zeos's $2,395 Pantera 486DX2/66) and the same software (Mosaic 1.0, CU_HTML, and HTML Assistant 1.0a). We were able to create Web pages very quickly and with little hassle. Our one complaint overall was that we didn't have a Wysiwyg HTML editor: You have to create the document in one editor, then view it in Netscape or Mosaic.



We also added in a graphics package—the $695 CorelDraw 5—to create nice graphics to stick on the home page. CorelDraw can export to the GIF format used in HTML documents, which makes it an ideal drawing solution.

As in the bargain solution, we called upon Electric Press to see how much it would cost to make our home pages available on the Web. The pricing was $4,000 for 25 pages per quarter. Electric Press also said they'd help us develop the layout and graphics.

SUITABILITY: *An easy-to-use solution.*
VERDICT: *Much of the hassle is handled by the service provider, so you don't need to hire a full-time Web administrator.*



SUMMARY

Pros: Very easy to use; capable of creating nice graphics.

Cons: Somewhat limited in what it can create easily; high quarterly costs.

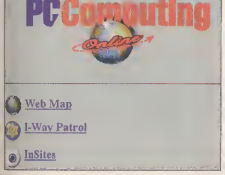
$3,189 plus $4,000 per quarter for 25 pages

HIGH-END SOLUTION

Personal Internet

If you're really serious about this Internet stuff, you'll want your own node, which means you're looking at an investment in hardware for a server, the monthly charges for a T1 line, and the monthly charges from whoever is connecting you to the Internet.

For the workstation, we again chose the $2,395 Pantera 486-DX2/66 from Zeos, and added some shareware (Mosaic 1.0, CU_HTML, and HTML Assistant 1.0a), then added Netscape ($99), SoftQuad's extremely powerful HoTMetaL Pro 1.0 HTML editor ($149), CorelDraw 5 ($695), and Epson's $1,239 ES-1200C scanner for bringing in graphics.



For the server, we selected the QP5/90 from Quantex ($3,049) running Windows NT Server 3.5 ($700). We added 3Com's EtherLink III 3C509 Ethernet card ($129) to attach it to our network. Then we added an HTTP server for Windows NT from the European Microsoft Windows NT Academic Centre, called simply HTTP Server.

We contacted UUNET Technologies, one of the complete service providers, and got a quote for a full 1.544Mbps T1 hookup of $6,267 to start the service, then an estimated rate of $1,800 per month (the actual rate would be based on our usage of the line). In addition, there was the cost of a CSU/DSU (basically a terminator for the T1) and a 2501 router from Cisco to connect the T1 to our network: together $3,420.

SUITABILITY: *An excellent, easy solution.*
VERDICT: *If you want users to have unhampered access to your home page, this is the way to go—but it ain't cheap.*

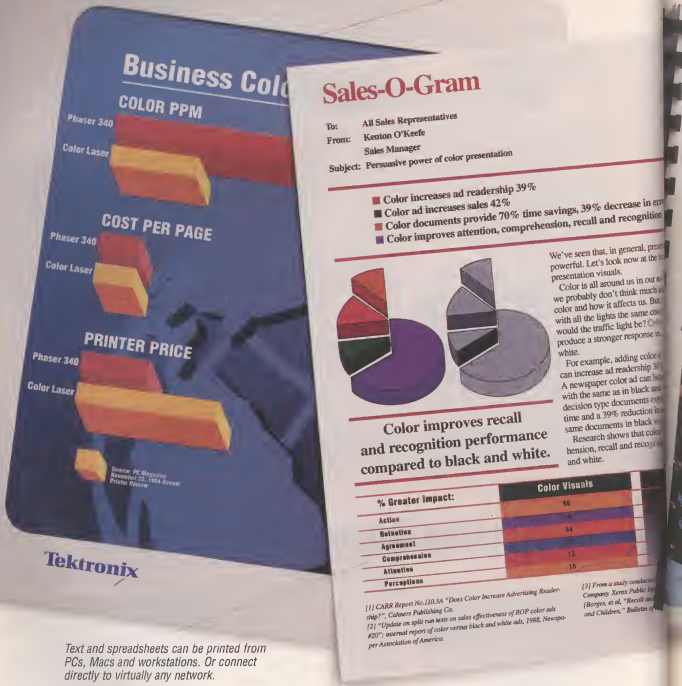
SUMMARY

Pros: Lets you create great pages.

Pros: Costly initial investment and monthly charges; requires an administrator.

$18,142 plus $1,800 per month (estimated)

World-class overheads at astonishing speed and an equally amazing price.



Text and spreadsheets can be printed from PCs, Macs and workstations. Or connect directly to virtually any network.

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It's the business printer you've been waiting for. Office color that's so easy to use, reliable, and inexpensive, it's a practical office tool. It's the new Tektronix Phaser™340 color printer.

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Print vibrant, high-end color on office papers for less cost per page than low-end color. They'll snap to attention.

Connect faces and places with photorealistic quality. Welcome to the world of practical color!

brilliantly practical.

this machine. Reliability? Add 750 sheets of paper and let it run overnight. Now, that's robust. Cost? At $4,995 there's nothing in its performance range that even comes close. Best of all, it's from Tektronix, a Fortune 500 leader, that's been making world-class color printers for 13 years. **The Phaser 340 Color Printer. So practical, it's brilliant.**

Tektronix

For free output sample or nearest dealer, call 800-835-6100, Ext. 1035.

Circle 123 on reader service card.

Get Your **Point** Across

Asking you to choose between desktop publishing, live presentation, and creating a home page on the Internet would be like asking you to choose between an apple, an orange, and a Bic pen. They're different and have different uses. Which is best for you? Maybe they all are. Each solution is good for providing information to a particular type of audience.

Desktop Publishing A solution that can range in price from fairly inexpensive to boisterously costly, desktop publishing lets you create documents that can be mailed or bound. It's best in two situations: when you have a lot of detailed information to convey (for example, a manual), and when you want to convey some information to a geographically dispersed audience (a fancy way of saying "newsletter"). It's at its worst when your audience is right in front of you, waiting to be entertained. Not that it can't be done, but there are better ways.

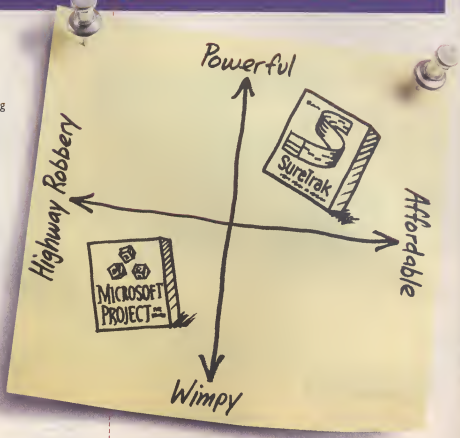
Live Presentation This solution has the potential for the most overlap with the other two: A good presentation can incorporate elements from desktop and online publishing. We focused on the traditional stand-up presentation where you're working with slides and an electronic presentation package. This kind of presentation works best with audiences that can be physically gathered to sit for the duration. It's weakest when your audience is spread across the country.

The Internet Today's society is increasingly going online, and it's a good idea to have some kind of stake planted on the most intriguing of the online publishing forums, the World Wide Web. A Web page lets you present information much the way a magazine does. In other words, you can arrange information by its density, first placing the view from 10,000 feet up to help users determine whether they want to drop down for the close-up details. The only problem with online publishing is that your audience is limited to people who have the time, technology, and inclination to sit at a computer and wade through the documents you've created.

DECISION MAKER — YOUR **AUDIENCE** DETERMINES THE BEST CHOICE

1 Define your target audience.	2 What kind of information do you have to present?	3 What's more important to you?	4 The solution you should look at first is . . .
Very Small	Detailed	Price	Budget DTP
		Contact	High-End Presentation
	Overview	Price	Budget Presentation
		Contact	High-End Presentation
Very Large	Detailed	Price	Budget DTP
		Contact	High-End Presentation
	Overview	Price	Usability Presentation
		Contact	High-End Presentation
Geographically Dispersed	Detailed	Price	Budget Online Publishing
		Contact	High-End Presentation
	Overview	Price	Budget Online Publishing
		Contact	High-End Presentation

Everything you need to know about project management software.



You're scrolling through screens. Shuffling cue cards. Wishing Microsoft Project had the power to organize by something as simple as who's responsible for what. But don't give up on project management software. Just think SureTrak Project Manager® for Windows.™

Think power. Other software doesn't take into account delays, changes, or the fact you might want another view of your project. Welcome to the real world. SureTrak shows the plan any way you like. Organize by phase, task, project, or responsibility. You name it. Plus, SureTrak sees a project the way it is–warts and all. So you get the real story, not a naive picture.

Think quick. Only SureTrak has Progress Spotlight.™ Just drag the data date and wham! A graphical to-do list of tasks, deadlines, and who's responsible appears right on your screen. Perfect for recording progress, too.

Progress Spotlight™ gives you a detailed look at upcoming activities.

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Slick Stuff: Interesting Alternatives to Standard Presentations

Extra! Extra! Read All About It!

Products that solve particular problems about how to present information come our way every day. They may not fit cleanly into a category like "desktop publishing," but they can give your message that extra edge. Here are some of the most intriguing presentation products we found.

Show On the Road: Fast Electronic's Movie Machine Pro captures video and Revered Technology's Power Cruiser notebook converts to an LCD projection panel.

Fast Electronic Movie Machine Pro This add-in card can record video from a camera or VCR (or any such source—even a television receiver) and pipe it into your PC. That's pretty cool. Imagine that you're with an ad agency: You can add clips from commercials to demonstrate points you're trying to make. Better yet, Movie Machine Pro has video-out capabilities, so you can create a presentation, demonstration, or even a commercial, then dump it onto a videocassette for easy viewing anywhere there's a VCR.

Software Publishing Corp. Harvard Spotlight It's not a presentation creation package. Instead, it provides an environment where it's easy to manage the slides in a presentation, giving you a kind of electronic green room. You just drag slides from the previewing area onto the viewing area in any order you want. It will accept slides composed in all of the major presentation packages.

Lotus Notes 3.2 Groupware: It's all the rage these days. A fast way to get groups working together and sharing information, Notes is an easy-to-use client-server database system. One of its best features is its ability to create discussion groups in which you can exchange ideas with others who are interested in a particular topic. Also interesting are its workflow features—Notes makes it fairly easy to route documents from point A to point B.

CONTACTS

INTERESTED IN A PRODUCT? HERE'S HOW TO **GET MORE INFORMATION**

Acrobat for Windows
Adobe Systems
(800) 833-6687, (415) 961-4400
$695, single-user; $2,495, unlimited network
Reader Service No. 751

CorelDraw 5
Corel Corp.
(800) 772-6735, (613) 728-8200
$695, CD-ROM; $895, disk
Reader Service No. 752

DeskJet 560C
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$599
Reader Service No. 753

Dimension XPS P90
Dell Computer Corp.
(800) 613-3355, (512) 338-4400
$4,849
Reader Service No. 754

Director 4.0 for Windows
Macromedia
(800) 945-4061, (415) 252-2000
$1,195
Reader Service No. 755

Electric Press
(800) 993-5773
$4,000/quarter for 25 pages
Reader Service No. 756

ENV6600S
Envisions Solutions Technology
(800) 365-7226, (415) 692-9061
$899
Reader Service No. 757

ES-1200C
Epson America
(800) 289-3776, (310) 782-0770
$1,239
Reader Service No. 758

EtherLink III 3C509
3Com Corp.
(800) 638-3266, (408) 764-5000
$129
Reader Service No. 759

Harvard Graphics 3.0 for Windows
Software Publishing Corp.
(800) 234-2500, (408) 986-8000
$395
Reader Service No. 760

Harvard Spotlight for Windows
Software Publishing Corp.
(800) 234-2500, (408) 986-8000
$129
Reader Service No. 761

Horizon Plus
Agfa
(800) 685-4271, (201) 440-2500
$19,995
Reader Service No. 762

HoTMetaL Pro for Windows
SoftQuad
(800) 387-2777, (416) 239-4801
$149
Reader Service No. 763

Illustrator 5.5
Adobe Systems
(800) 833-6687, (415) 961-4400
$595, Macintosh version
Reader Service No. 764

Kai's Power Tools 2.1
HSC Software Corp.
(800) 472-9025, (805) 566-6200
$199
Reader Service No. 765

Movie Machine Pro
Fast Electronic
(800) 684-6684, (415) 802-0772
$945
Reader Service No. 766

Netra i Workgroup Server
Sun Microsystems
(800) 662-4786 ext. 46344
$10,399
Reader Service No. 767

Netscape
Netscape Communications Corp.
(800) 638-7483, (415) 254-1900
$99
Reader Service No. 768

Notes for Windows
Lotus Development Corp.
(800) 343-5414, (617) 577-8500
$495, single copy
Reader Service No. 769

PageMaker 5.0
Adobe Systems
(800) 833-6687, (415) 961-4400
$895, Mac or Windows version
Reader Service No. 770

continued on page 134

Now Everyone Can Have The Superior Monitor.

Photo Credit: Peter John Griffith/Time-Life Books

If you've always wanted a top performing monitor, now is the time.

For the first time, you can take a premium 17" Nanao monitor back to your office for less than $1,000. Which is why hard working graphics pros around the world are picking up our new T2•17TS and F2•17EX monitors in record numbers. Sure, the price is terrific. But these users are drawn by Nanao's reputation for quality plus a stunning new array of advanced technical features that are ideally suited for the graphics environment. Nanao even offers a choice of 17" models to satisfy your individual preference. Our FlexScan T2•17TS has an advanced Aperture Grill tube, while the F2•17EX features a flat-screen Invar Shadow Mask tube. Both monitors provide the power you really need to achieve true-to-life colors, crisp typography and a stable screen image. Ultra high 1280 x 1024 resolution at 82Hz refresh rate, Colorific™ color management software and on-screen image controls deliver a new level of graphics performance. For added safety against radiation emissions, TCO compliance is now available as a standard feature.

If you've been looking for a superior 17" monitor at an equally great price, your search is over. The T2•17TS and F2•17EX are available – and affordable – from Nanao.

F2•17EX	
Dot Pitch	0.26mm
Scan Freq.	H:30-86kHz, V:55-160kHz
Rec. Resol.	1280 x 1024 @ up to 82Hz
Max Resol.	1600 x 1200 @ up to 66Hz
On Screen Control	ScreenManager™ and ScreenManager™ Pro
Standards	MPR-II, TCO

T2•17TS	
Dot Pitch	0.25mm
Scan Freq.	H:30-86kHz, V:55-160kHz
Rec. Resol.	1280 x 1024 @ up to 82Hz
Max Resol.	1600 x 1200 @ up to 66Hz
On Screen Control	ScreenManager™ and ScreenManager™ Pro
Standards	MPR-II, TCO

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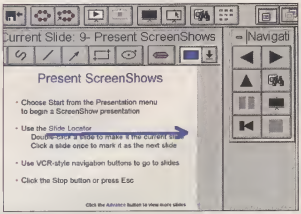
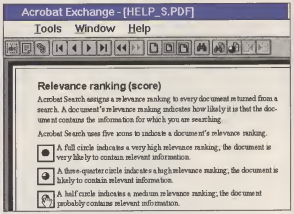
Slick Stuff: Information Transportation—Anytime, Anywhere



Lights, Camera . . . Harvard Spotlight lets you pop around the slides in any presentation out of order.



Acrobatics: Adobe's Acrobat makes documents look the same, no matter what platform you have.

Revered Technology Power Cruiser If you don't want to lug around a notebook computer and an LCD projection panel, Revered Technology's Power Cruiser offers the solution. The LCD screen detaches and becomes your projection panel.

Sun Microsystems Netra i Workgroup Server If you're serious about getting onto the Internet, Netra i can provide an easy gateway. It's a turnkey system where you plug one end into your PC network and the other into the Internet. Netra i takes care of letting your LAN get onto the World Wide Web and exchange e-mail with Internet sites.

Adobe Acrobat 2.0 An office with different types of computers and operating systems can encounter a lot of potholes on the road to going paperless. Adobe's Acrobat provides part of the solution. Make a document in Acrobat, then post it in a common location. No matter how complex the formatting, users of both Macs and PCs will have no problem seeing exactly what you created.

CONTACTS

HOW TO **GET MORE INFORMATION** *continued*

Painter 3.0
Fractal Design Corp.
(800) 297-2665, (408) 688-5300
$499, Macintosh; $399, Windows
Reader Service No. 771

Pantera 486DX2/66
Zeos Int'l
(800) 423-5891, (612) 623-9614
$2,395
Reader Service No. 772

Photoshop 3.0
Adobe Systems
(800) 833-6687, (415) 961-4400
$895, Mac or Windows
Reader Service No. 773

Picture Publisher 2.0
Micrografx
(800) 733-3729, (214) 234-1769
$595
Reader Service No. 774

Poly Dual 5100 EP2
Polywell Computers
(800) 999-1278, (415) 583-7222
$9,995
Reader Service No. 775

Power Cruiser
Revered Technology
(800) 220-8919, (805) 445-6655
$6,995
Reader Service No. 776

Power Macintosh 8100/110
Apple Computer
(800) 776-2333, (408) 996-1010
$13,531
Reader Service No. 777

PowerPoint 4.0 for Windows
Microsoft Corp.
(800) 426-9400, (206) 882-8080
$495
Reader Service No. 778

PrimeraPro
Fargo Electronics
(800) 327-4622, (612) 941-9470
$1,500
Reader Service No. 779

ProColor 2101V
Boxlight Corp.
(800) 762-5757, (206) 779-7901
$7,299
Reader Service No. 780

Publisher 2.0
Microsoft Corp.
(800) 426-9400, (206) 882-8080
$199, CD-ROM Edition
Reader Service No. 781

Quantex QP5/90
Quantex Microsystems
(800) 288-0566, (908) 563-4166
$3,049
Reader Service No. 782

QuarkXPress 3.2
Quark
(800) 788-7835, (303) 894-8888
$895, Macintosh; $995 Power Macintosh
Reader Service No. 783

ScanMaker IIHR
Microtek Lab
(800) 654-4160, (310) 297-5000
$849
Reader Service No. 784

SmartJet 4012
Iris Graphics
(800) 947-4712, (617) 275-8777
$33,500
Reader Service No. 785

Toshiba T2150CDT
Toshiba America Info. Systems
(800) 334-3445, (714) 583-3000
$4,899
Reader Service No. 786

trueSpace
Caligari Corp.
(800) 351-7620, (415) 390-9600
$795
Reader Service No. 787

Turbo PC
Mirus Industries Corp.
(800) 942-9770, (408) 980-6600
$5,995
Reader Service No. 788

Visio 3.0
Shapeware Corp.
(800) 446-3335, (206) 521-4500
$249
Reader Service No. 789

Windows NT Server 3.5
Microsoft Corp.
(800) 426-9400, (206) 882-8080
$700
Reader Service No. 790

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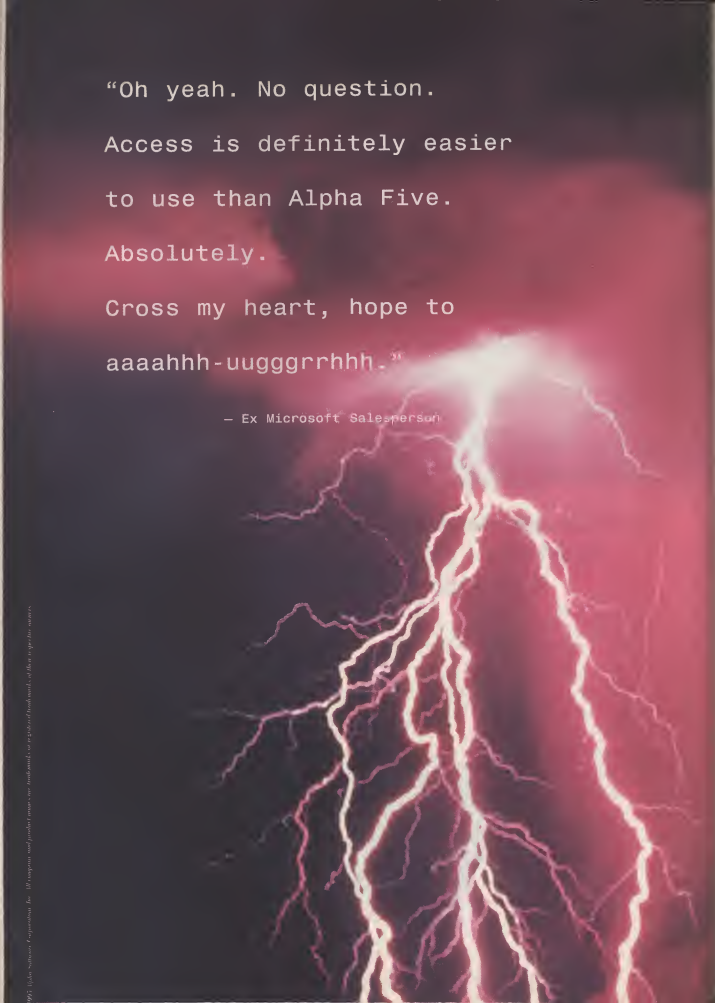
"Oh yeah. No question.
Access is definitely easier
to use than Alpha Five.
Absolutely.
Cross my heart, hope to
aaaahhh-uugggrrhhh."
— Ex Microsoft Salesperson

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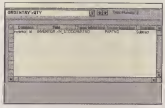
Time and again we run into customers who tell us Microsoft is out there saying Access is actually easy to use. Well, we'd like to set the record straight.

They're dead wrong. Think we're exaggerating? No way. For example, let's say you want to perform a task as fundamental as setting up an order entry system with live inventory updates.

With Access, you get to write and debug 51 lines of code that make conjugating Latin verbs seem like child's play. But Alpha Five™ has a ready-made solution built-in. Just choose the posting rule from a drop-down menu, fill in a simple table, and you're done.

In fact, Alpha Five has dozens of built-in solutions for virtually every database task. So you can do anything you want by simply pointing, clicking, dragging and dropping.

Alpha Five



For fundamental tasks like live order entry; just fill in an Alpha Five table. Or write and debug 51 lines of complex Access code...you decide.

Microsoft Access

We've even got Genies to walk you through building databases, reports and queries from new or existing files. It's easy to build even the most serious applications in virtually no time at all.

All of which makes Alpha Five a lot easier to use and learn than Access. And if anyone tells you otherwise, well, check to see if their nose is growing. Visit your software reseller today, or call 800-451-1018 Ext. 555 to get a free trial version ($9.95 shipping and handling).

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For Windows

The Powerful Database Anyone Can Use.

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ABQ

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ROI ANALYSIS

Productivity: The Dollars and Sense of Modems, Scanners, and OCR

Paperless Payoffs

SYNOPSIS

ADD IT UP: *There are faster and easier ways to capture and send documents. And they can pay for themselves in as little as 17 days.* **140**

28.8KBPS MODEMS: *Faster is usually better, but not always.* **142**

FAX MODEMS: *If you send a lot of faxes, a fax modem will really pay off.* **144**

SCANNERS & OCR: *Typing from paper into a word processor works, but a scanner and OCR can do the job faster.* **146**

FINAL ANALYSIS: *Here's how to cost-justify the upgrade you need.* **148**

Who knows what savings lurk in the hearts of modems? We know, thanks to the *PC Computing* Usability Labs. Not only can we project the savings you can reap by upgrading to a faster modem, we can show the financial advantages of using fax modems instead of fax machines. And as if that weren't enough, we also can give you the bottom line on optical character recognition (OCR).

What's the final verdict? Any of these three technologies can pay for itself in a matter of weeks by saving you time and, in the case of faster modems, reducing your phone bills.

How did we figure all that out? With the aid of our Usability Labs, we applied the newest technologies in modems, fax modems and scanners to some of the oldest tasks: taking care of e-mail, downloading mastodon-sized files, faxing single pages, faxing long documents, mass fax mailings, operating an office PC remotely, and typing in short and long documents.

As you might guess, few of the solutions turned out to be universal panaceas. On some, the time savings was immediately obvious. Other times, the manual solution, no matter how low-tech, was at least a match for the high-tech solution.

In our Usability Labs, we compared the speed and long-distance cost difference between using a 14.4Kbps modem and a newer 28.8Kbps modem. We also pitted a good manual fax machine against a fax modem. And the average twiddling fingers of ordinary PC users, not professional typists, fought against a scanner and OCR software.

We used 10 test subjects, all experienced computer users. Throughout the project, we asked the testers—whose real-life occupations ranged from college administrator to police officer—to pretend they were sales reps for a small toy manufacturer. As part of their job, they were always on the road, but they had

BY RON WHITE

A 28.8KBPS MODEMS: Depending on your tasks and whether you use long distance a lot, a 28.8Kbps modem may merely save you time compared with a 14.4Kbps modem—or it could save you thousands of dollars a year.

B FAX MODEMS: For sending short or long faxes, a fax modem is the best way to go. And for sending lots of people the same fax, it's criminal not to use a fax modem.

C SCANNERS & OCR: A flatbed scanner and OCR software make short work of converting long documents to editable text.

PHOTOGRAPHS BY FRED STIMSON

Fax Neater: A fax modem is not only faster, but it cuts down on paper clutter.

Transcribe Easier: For long documents, scanning and OCR save you time.

to keep in constant contact with the home office.

We told them to do what many people do with these products: connect to headquarters and, using Microsoft Mail, open their e-mail and send a few new messages, including one with a modestly sized 15K bitmap. They had to download a 2MB monthly inventory spreadsheet, and perform tasks remotely, including changing the name of a file, and opening and editing documents in Microsoft Word. We had them fax a price sheet to their managers, fax a 10-page report to a VIP customer, and fax a one-pager to a list of customers. Then, just to end an already harried workday, we made the surrogate reps retype a new customer contract and a list of the office staff's phone numbers—then repeat the task using a scanner and OCR software. All in all, a fairly tough working day, but nothing out of the ordinary.

We made several assumptions about the testers and the virtual world they inhabited. For all the tests we assumed a salary of $26 an hour, which just happens to be the real average wage of a *PC Computing* subscriber. We assumed that the testers previously had been spending a half hour per day on each of the 10 tasks they had to perform. We used this time frame to determine how much more productive work time, if any, could be gained by the newer methods of doing the same jobs. (Remember, though, that any newfound time can be used to do more work—or watch movies in the hotel.) Finally, we assumed a flat rate of 25 cents per minute for telephone calls from Boston to San Francisco. Using these figures and test results, we calculated how much money each upgrade could save you and how long it would take the upgrade to pay for itself with those savings.

For the modem tests, we assumed our fictitious sales reps already had a 14.4Kbps modem, Microsoft Mail, and Traveling Software's LapLink 6.0; the only upgrade cost would be for a U.S. Robotics Courier V.Everything with V.34 28.8Kbps modem. For the faxing tests, they already had an ordinary, but decent, sheet-feeding fax machine. Their upgrade costs would include a U.S. Robotics Courier V.32 bis 14.4Kbps fax modem and Delrina's WinFax Pro on the software end. To test manual typing vs. the tag team of scanning and OCR, we assumed the reps already had Microsoft Word, and that a high-tech solution would require them to buy a Hewlett-Packard ScanJet 3p flatbed scanner without a sheet feeder. The scanner comes with Caere WordScan OCR software. All the tests were conducted on a 66MHz 486 PC.

Your results may differ according to how often you or your workers have to perform the tasks our users did, how much you or your employees are paid, your long-distance rate, and the size of the data you work with. But we've made it possible for you to plug your own time usages, salaries, and long-distance charges into formulas that predict time and money savings for your individual situation (see "Add It Up," below).

The test results always measured time, which our formulas translate into dollars and cents, and into how quickly hardware purchases pay for themselves. But we also looked for improved accuracy and job satisfaction. We interviewed the testers when they completed all of their tasks to harvest the less tangible results of the new solutions. Generally, our dedicated PC users took to the high-tech solutions readily. But there were a few instances that drew only yawns. Read on to find out which of the solutions left the testers underwhelmed and which ones our Usability Labs rate as must-haves.

ADD IT UP TO FIGURE YOUR **PAYBACK,** PLUG YOUR NUMBERS INTO OUR FORMULAS

How We Measured the ROI of Upgrading

We used the following formulas to calculate the payback gained from purchasing a 28.8Kbps modem, a fax modem, or a scanner and OCR software. To assess a rate of return specifically tailored to your circumstances, combine our test results with your hourly wage and the number of hours you use a PC each month for specific kinds of tasks. The result is your payback schedule.

These formulas are also available in Excel 4.0 or Lotus 1-2-3 Version 2.01 format as PAYBK2.ZIP in data library 6 (Tips & Macros) of PC Contact. See page 298 for downloading instructions.

Our calculations depend on correct figures for the following terms:

Cost: The price of the upgrade. You can use our street prices (download PRICES.ZIP from data library 6 of PC Contact) or substitute your own figures.

Hours You Use a PC: The number of hours you use your computer every month. Our calculations are based on relatively heavy PC use.

Salary: Use your salary to calculate your hourly pay rate.

Productivity Increase: The time it takes to do a task with an upgrade divided by the time it takes to do the same task without the upgrade. You can conduct your own tests, or use the productivity increases determined by our testing for the type of tasks that most closely match your own.

ROI Formulas

Time for Upgrade to Pay for Itself:
Time = Cost ÷ (Hours You Use a PC x Salary x Productivity Increase)

Payback after One Year of Use:
Payback = –1 x [Cost – (12 x Hours You Use a PC x Salary x Productivity Increase)]

Productive Hours Gained after One Year:
Hours Gained = 12 x (Hours You a Use PC x Productivity Increase)

PC Contact

WHAT OUR ENGINEERS HAD IN MIND WHEN WORKING ON OUR NEWEST SCANNER.

Introducing the Agfa StudioScan II.

Push a button, make a scan. Is it really that simple? With the new Agfa StudioScan II, it can be.

That's because StudioScan II was designed for simple operation. Two levels of scanning software are built in — easy-to-use Agfa FotoSnap and comprehensive Agfa FotoLook. Plus, our exclusive, 42-page *Introduction to Digital Scanning* will guide you through the scanning process.

What's more, every StudioScan II comes complete with Agfa FotoTune LE color management software and our IT-8 reference target, along with Adobe PhotoShop™ LE and OmniPage Direct™ OCR software. All in a 400 x 800 ppi, 30-bit, one-pass scanner. And all for about $1,000.

So if you want an easy way to bring a scanner into your office, all it takes is the new StudioScan II. And your finger. Call 1-800-685-4271, ext. 2780 to find out more information on Agfa's new scanners.

AGFA

The complete picture

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Circle 168 on reader service card.

Slashing Online Time

When you're telecommuting, each tick of the clock sounds like the ring of a cash register. You're burning up roughly a quarter for each long-distance minute you're online, and you're burning up your own time, which can be even more precious. Will upgrading from a 14.4Kbps modem to a 28.8Kbps modem make that much of a difference?

PC Computing's Usability Labs designed a series of tests to put both modems and fumbling fingers through their paces and uncover where you can expect to find the biggest savings by upgrading.

We ran four tests, first with a U.S. Robotics Courier V.32 bis 14.4Kbps modem, and then using a U.S. Robotics V.Everything with V.34 28.8Kbps modem. We figured the cost of upgrading to the faster modem at a real mail-order price of $419. The first trial required the testers to connect to their "home-base systems" via the modem, open Microsoft Mail messages, and respond to three of them. For the second test, they again gained remote access to their e-mail and sent two messages, including one with a 15K bitmap. For the third test, the subjects connected to a remote PC using Traveling Software's LapLink 6.0. They had to find a particular file and change its name. They opened a report in Microsoft Word, made changes, then changed the name of the report and saved it again. In the fourth test, we timed downloading a 2MB inventory spreadsheet—the PC equivalent of putting the pedal to the metal and seeing how fast a modem can go.

Shrinking Time Einstein thought time is not a constant. If Al were alive today, he could find hard proof for his theory in the results of our modem tests. In some tests the faster modem cut time in half. Predictably, the most impressive results were in downloading the 2MB file, a task that required the least interaction by the testers. The transmission was 53 percent faster using the 28.8Kbps modem. Using our average *PC Computing* reader's salary of $26 an hour and assuming a half hour per day doing such downloads, the net savings—the return on investment—comes to over $1,200 the first year alone. At that rate it would take only about three months for the modem to pay for itself.

The least savings came in the first task, responding to e-mail, where a software limitation topped out our transmission at 19.2Kbps. In this task, which involved typing while connected, there was no statistically significant performance advantage to using a 28.8Kbps modem instead of a 14.4Kbps modem.

In a task where human fingers were less influential—sending e-mail with an attachment—there was a modest net gain. The 28.8Kbps modem was 15 percent faster. Using our $26 per hour salary assumption, and figuring on a half hour each workday spent using e-mail, the 28.8Kbps modem increases productive time by just over 18 hours in a year. Subtract the modem's cost of $419, and in a year, our scenario shows a net gain of over $60.

In the final test, we used the two types of modems to control a remote PC. In a Windows environment, this meant pushing scads of graphics over the phone lines—a more grueling test than the task's simple operations indicated. Using the faster modems would add 37 productive hours to the year, for a net gain in our scenario of about $550.

The gain in productive hours is not the only way to offset the modem cost. In long-distance remote computing—which we pegged at 25 cents a minute—faster transmission means real savings. In our scenario, the net of both additional productive hours and long-distance savings comes to more than $1,100. Figuring in long distance raised the net gain on large files to over $2,200. With long-distance e-mail, it showed a smaller but significant gain of just over $300 per year.

An average of the time saved on our four types of tasks resulted in a net gain the first year of over $200. But when you add in long-distance savings, the net gain is over $600. In other words, all the tasks except for live e-mailing get a payback at least during the second year.

Our Recommendation If all you use a modem for is online e-mail, keep your 14.4Kbps model. But if you transmit a lot of large files—in fact, unless you use a modem only for online e-mail—buying one or even two 28.8Kbps modems is a smart purchase. If long-distance charges are part of the picture, not getting the faster modem is fiscal recklessness.

Online Savings Galore: A 28.8Kbps modem can cut online time in half, but not for all tasks. And (of course) this is true only if there's a similar modem on the receiving end.

Make Your Case: Faster Modems Save Money

1. Our tests show that a 28.8Kbps modem can **cut transmission times** for large files in half.
2. Faster transmissions **slash long-distance charges** when you're on the road using hotel phones.
3. Even tasks with marginal benefits **pay for themselves** during the first year of ownership.

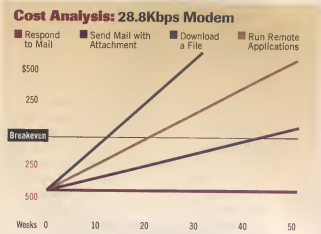
Sometimes speed is subjective. The charts on this page spell out when a faster modem can yield real dollars-and-cents benefits. But even in the one case where a 28.8Kbps modem didn't offer any performance advantage—handling e-mail alone—you'd never know it by talking to the testers. The 10 test subjects almost universally described using the 28.8Kbps modem for e-mail as "very fast" or "much faster" when actually on average it took slightly longer for the testers to do the same tasks on the faster modems. That's right, it took slightly longer, primarily due to the slightly increased time it took to negotiate a 28.8Kbps connection between the two modems.

Quick Payback: You can expect a 28.8Kbps modem to pay for itself in three months—less if you're sending files long distance.

BIG FILES 61 DAYS

Cost Analysis: The big payoff is in transmission of large files over long-distance lines. The more you use long distance, remote control of a PC, and large files, the sooner you'll get a real gain in savings and productivity. Because prices vary so much, we didn't factor in the premium prices hotels charge for long-distance (or even local) calls. But it's a very real factor when you're considering an upgrade to a fast modem. Some hotel chains impose a 200 percent charge for your calls.

Buyer's Price: A 28.8Kbps modem is still several times the price of a 14.4Kbps modem, because the faster modems are relatively new technology.



SOURCE: PC COMPUTING USABILITY LABS

But that's always been the case with new modem technology. For example, 14.4Kbps modems debuted at prices upwards of $500. Now you can buy one for less than $100. That's only a fifth the price of just three years ago. The same is true of 9,600-bps modems. Our research indicates that you can expect the economies gained from mass manufacturing 28.8Kbps modems to appear within the next year, reducing prices significantly. But if large files and long-distance charges are already eating into your time and budget, don't wait.

Less Is More: Less time on a modem means more time for productive work. We found that people who transmit large files and who operate a PC from a remote location stand to benefit the most from a 28.8Kbps modem—especially when they're paying inflated hotel phone rates. Those who spend most of their time using e-mail software show little benefit—although they may feel more productive because they spend less time waiting for a response.

AMMO CUT ONLINE TIME IN HALF

1 Choose the kind of tasks you do most often.	2 What are the variations in your online tasks?	3 The best ammunition in your argument for upgrading is . . .
Handling E-mail	Read, Answer Online	Stick with your 14.4Kbps modem.
		Don't try to justify an upgrade.
	Attach Small Files	Payback in under a year.
		After payback, a gain of $60+ the first year.
Transmitting Large Files	Local Phone Service	Only 3 months to payback.
		Net gain of $1,000+ each year after payback.
	Long-distance Phone Service	Net gain first year of $2,000+.
		Pocket another $2,000+ each following year.
Remote Control	Local Phone Service	Pays for itself in 21 weeks.
		Net return of $500+, gross around $1,000.
	Long-distance Phone Service	Net jumps to nearly $700 the first year.
		Net return of $1,500+ in following years.

Paperless Is Profitable

Somewhere on the road to the paperless office paradise, the fax machine hitched a ride and took over the driver's seat. The fax machine transmits million-dollar contracts and orders lunch from the corner deli. But when the fax jams or runs out of paper, it's just one more thing that screws up.

The fax modem resurrects dreams of the paperless office, where bytes replace bond and your faxing is faster and cheaper—at least, in theory.

We put theory to the test in *PC Computing*'s Usability Labs, pitting conventional fax machines against a U.S. Robotics Courier V.32 bis 14.4Kbps fax modem and Delrina's WinFax Pro software. We calculated street prices for the modem at $115 and the software at $77. We counted on a salary of $26 an hour (average for a *PC Computing* reader). And we figured you're spending a half hour daily on three types of faxes.

We told the testers to stay in character from the high-speed modems tests: They were traveling reps with a toy company. First, we wanted to test the speed for sending a common one-page fax. The subjects created a cover sheet and then faxed that along with a one-page price sheet. For the second test, the testers had to fax the list to 10 customers—a single page to many people, also called a broadcast fax. The final test was sending a 10-page report plus cover sheet to a single customer. In each of the conventional faxing tasks, we included the time to print the fax with a laser printer.

Faxual Testing If you don't think that fax machines are obsolete, wait till you see our test results. In all tasks, the fax modem was faster than the fax machine. Based on our research and salary assumptions, the cost of a fax modem was recovered within weeks on most tasks—and in just over four months for the task showing the least improvement.

Fast Fax Fix: A fax modem frees you from fax-machine prison, especially when broadcast faxing: The modem automates the work with customized mailing lists.

Conventional fax machines cost $400 to $1,000 on the street, and fax paper costs about 10 cents per page. They aren't convenient to take on the road since they're bigger than most laptop PCs, whereas a fax modem is portable when built in to a notebook computer.

The most impressive results were in faxing one page to several people. The fax modem and software outperformed the machine by 88 percent. One reason is obvious: With a fax machine, a person has to punch in a phone number, complete the first fax, call another number, and so on. No one can dial as fast—or as accurately—as software and a modem. And you don't have to spend all that dead time during the actual, slow churning of the mechanical fax. Your PC is back at more important work while the fax modem continues to transmit in the background.

With our cost and salary assumptions, the upgrade would pay for itself in three weeks. At the end of a year, the modem would have added more than two weeks of extra productivity—a net savings of over $2,000 in our scenario. Clearly we can say that the more you're into multiple faxes, the more you should have a fax modem.

If not for the skyscraper results in broadcast faxing, the test of faxing one page to one person would grab headlines. With a 45 percent speed improvement, the tag team of fax modem and software paid off in just under two months, and netted a gain of over $1,000 by the end of a year. To calculate your own annual savings, use our formulas (see "Add It Up," page 140); if your average salary is under $26 per hour, you should still see a positive return on investment within a year.

Even the least impressive test results were still positive. Faxing a multiple-page document to one person showed only a 17 percent improvement. But, in our scenario, the modem/software dynamic duo would pay for itself in just over four months, leaving more than $300 in the annual budget.

Our Recommendation Get a fax modem. You don't have to be a rocket scientist to figure this one out. You'll save time and money. And eliminating the step of the fax machine scanning in the image makes your purely digital image look better.

Although we didn't test receiving faxes, if you use the modem for incoming faxes you have the additional advantage of being able to use optical character recognition (OCR) to convert the fax to editable text. And if you really need hard copy, you can print out your fax on a regular printer, not on the common, curly, and cursed thermal fax paper.

Make Your Case: Paperless Faxing Pays a Profit

1. A fax modem sends a typical one-page fax **nearly twice as fast** as a fax machine can.
2. You can distribute one fax to many people **88 percent faster** using stored phone lists.
3. It **pays for itself** and returns over $2,000 extra in one year for average faxing needs.

With a fax modem, the question is not whether you'll save money, but *how much* money you'll save and how little time it will take to save it. For an initial investment roughly equal to dinner for four at a nice restaurant, you'll be saving money at an amazing rate. Throughout our tests, we consistently found modem faxing to be faster than its older, shiny-paper cousin. In fact, even the smallest improvement we found was 17 percent—and that was for the multiple-page fax job. And the most stellar 88 percent improvement for sending one page to many recipients shows that it's exactly the type of job for which a fax modem and smart software were created.

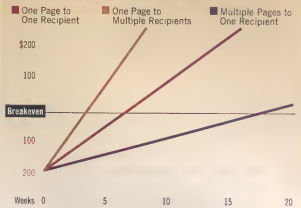
Pays for Itself: Little surprise here—for all types of faxing, it only takes a few weeks for a fax modem to pay for itself.

BROADCAST FAX 17 DAYS

Cost Analysis: The combination of relatively low cost for a 14.4Kbps fax modem and software, plus increased productivity, means the modem and software can pay for themselves—and then some—all within a year. On the tasks we assigned, our testers would earn a payback between $300 and $2,000 in just one year. And that's even after they've recouped their original investment in the technology.

Buyer's Price: A 14.4Kbps fax modem can be had these days for nearly pocket change. We found them for as little as $115, and the best software you can find to run them costs less than $80, street price. (Most fax modems even come with reasonably good fax and communications software for free). Though prices will inevitably fall further, it doesn't pay to wait before buying. Our research shows that 14.4Kbps modems are reaching the bottom of their price curve, with the final steps appearing more and more gradually. With the payback you can get, even at twice the price we figured, a fax modem is not only a bargain, it's a virtual cash machine.

Cost Analysis: Fax Modem



SOURCE: PC COMPUTING USABILITY LABS

All-around Winner: For all types of faxing—from a quick one-pager to a wide-scale distribution scheduled to run during off hours—a fax modem produces a fast payback: There's no excuse not to include one as standard operating equipment in any office. They're inexpensive, fast, handy, and save a few trees, too. Even if you spend only a half hour a day sending faxes, you'll save money with a fax modem. The fax machine is dying.

AMMO COMMUNICATE **FASTER** WITH A FAX MODEM

1 Chose the type of faxing you do most	2 What do you fax second most?	3 The best ammunition in your argument for upgrading is . . .
One Page to One Person	One Page to Many People	Payback in a few weeks.
		Net gain of $2,000+ in the first year.
	Many Pages to One Person	Payback after about 10 weeks.
		First year net gain of more than $300.
One Page to Many People	One Page to One Person	Modem/software payback: just a few weeks.
		Net return of $1,500+ after one year.
	Many Pages to One Person	A couple of months to payback.
		Over $1,500 in the black after one year.
Many Pages to One person	One Page to One Person	After 3 months, payback in productivity.
		Combo yields $400+ net gain in first year.
	One Page to Many People	Just over 3 months to pay for everything.
		A net gain of $900+ in the first year.

Scanners and OCR: When Technology Costs Less

From Paper to Screen

Which is quicker: the hand or the eye? Or, in this case, which is better: a scanner and optical character recognition, or getting information into your word processor the old-fashioned way—by *typing* it?

When a magician is at work, the hands are clearly faster. But when it comes to getting text into a computer the odds are even. When we tested both methods, the hands—old-fashioned typing—won the first bout and the eyes—the scanner and OCR—won the second.

Perhaps you don't think of scanners when you're trying to figure out the best way to move text from paper to computer—scanners are still largely confined to graphics work. And OCR sounds like some exotic technology that, like talking computers, is a little too far-fetched. Yet for those who need to move multiple text pages from paper to word processor, a scanner and some OCR software is a real, profitable solution.

We tested that premise using a Hewlett-Packard ScanJet 3p, which includes the OCR software Caere WordScan 3.0. We found them with a street price of $469. As in our other tests, we assumed the user had the $26-an-hour salary of *PC Computing*'s average reader, and that the person had been spending—pre-upgrade—a half hour a day on each of two tasks.

We chose two chores that fit our profile of a sales rep for a toy manufacturer. One job was to type and then scan and use OCR on a 25-item phone list, a task requiring exceptionally careful attention to accuracy. A spelling-checker, after all, can't recognize a mistyped phone number. In the other test, we had the subjects manually retype a copy of a short, one-page nondisclosure agreement, then scan and use OCR on the form. Both manual typing and OCR necessitated manual correction, although the OCR software helped by spotting and marking nearly all the suspicious characters and words with different onscreen colors.

Spend Less Time Typing: For getting a little text into your word processor, typing is still faster. But for converting long documents, get a scanner and OCR.

Win, Win On typing a short section of text—the nondisclosure form—the stopwatches showed that manual typing was 5 percent faster than using the high-tech solution. The percentage is not statistically significant, but it does indicate that at best, a scanner and OCR are only on a par with an average typist when there's not a lot to type. That's because powering up the scanner, getting the document positioned just right, and launching OCR software carry their own overhead time that's the same regardless of the size of the job. Of course, if you're a *slow* typist . . .

So call it an even heat for the two methods. But if you need a tie-breaker, consider this: Testers rated their subjective satisfaction with the scanner-and-OCR solution at 4.5 out of a possible 5 points, and they gave manual typing even a short form a 2.5 rating. Why? One reason is the perception that using OCR is easier than typing, even if the clock says OCR is no faster. The other explanation is that OCR was still a novelty for most of the testers: They liked the scanner-and-OCR combo because it was a shiny, neat toy.

On the second task—typing vs. scanning and using OCR on a long document—OCR performance jumped by 36 percent. One reason is that setting up the scanner and launching WordScan becomes a smaller piece of the entire operation.

The productivity increase with long documents lets the scanner and OCR software recoup their own cost in five months. After a year, our typical long-document user would gain an extra week of productive time and add hundreds of dollars to the company's coffers, even after paying for the scanner and OCR program. Even if your work is an even mix of long and short documents, at the end of a year there's a gain of about 20 hours, and the combination pays for itself early in the second year.

Our Recommendation Sure, we all get a kick out of technology, and OCR is about as cool as software gets without having a screen where something explodes. But it's not just another case of useless bells and whistles. It represents a real productivity increase and happier workers when it comes to transforming hard copy to editable text.

Overall, we're convinced that a scanner and OCR combination increases productivity enough to be standard in all offices. If, in addition to the tasks we tested, the scanner is used for digitizing photos and artwork, it not only increases productivity in other ways, it's performing tasks that have no manual equivalent at all, yet can add value to your work.

Make Your Case: Scanning Beats Hunt and Peck

1. For retyping short documents, **keep your fingers handy.** They're still good for something.
2. Even when a scanner/OCR combo tied in speed, we found that **job satisfaction** went up.
3. For long documents, scanner wins hands down for **speed and accuracy** over manual typing.

Using a scanner for OCR is a winner in two ways. For long documents, our *PC Computing* Usability Labs testing showed it couldn't be beat for speed. And although it was a tad slower than manual typing in our test of short documents, the scanner still won overall. Plus, our testers gave scanning even short documents a much higher subjective job-satisfaction rating than typing.

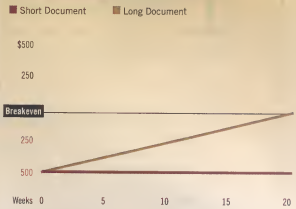
Scan Can: For OCR of long documents, a flatbed scanner pays for itself in 101 days. On short documents, it's an even heat with manual typing.

LONG DOCUMENTS 101 DAYS

Cost Analysis: The flatbed scanner we tested was the most expensive upgrade in this series. But if you spend at least a half hour a day retyping copies of lengthy documents, it will pay for itself in 20 weeks. By the end of the first year, we calculated that an OCR-cranking text scanner will produce a net gain of over $650. Naturally, your mileage will vary some based on how much you pay for your scanner and how much you pay the person doing the typing, but the fact that you'll save money in the long run is nearly irrefutable if you do any serious conversion of paper documents into electronic ones.

Buyer's Price: Flatbed scanners include complicated combinations of gears, pulleys, and light-sensitive diodes that don't lend themselves to the economy you get from packing more functions onto fewer chips.

Cost Analysis: Scanner and OCR



SOURCE: PC COMPUTING USABILITY LABS

Accept the fact. Don't try to do serious text scanning on the cheap—sub-$100 hand scanners are plentiful, but they won't be worth even the minimal price you pay for them. They're fine for small photos and artwork, but not for mass OCR. And if your office is *really* into converting *really* long documents into text, include an automatic document feeder in the configuration. It'll be worth the couple hundred dollars extra to be able to stack 10 or 15 sheets in a hopper and leave the machine to do its stuff.

Scan Land: If you have any daily need to convert hard copy to editable text, it's hard to reach a branch of our decision tree that doesn't come down to a limb marked "Buy." (Unless you never need to turn paper into electronic copy.) The question is exactly what to buy. The factors that shape your decision require some thought up front about the length and type of documents you'll be scanning—bound or loose-leaf, for example—and your need for other scanning tasks.

AMMO GET **SPEED AND ACCURACY** WITH A SCANNER

1 Choose the kind of scanning you'll do.	2 What are your other scanning needs?	3 The best ammunition in your argument for upgrading is ...
Long Documents	Full-color Graphics	Payback in about 5 months.
		Pay more for a color flatbed scanner.
	Black-and-white Graphics	You really need a sheet feeder.
		Minimum payback of $400 the first year.
Short Documents	Full-color Graphics	Graphics make a scanner worthwhile.
		Use the scanner for short documents anyway.
	Occasional Long Documents	Worthwhile on long documents.
		Graphics are a bonus when you need them.
Rarely Need to Scan Documents	Black-and-white Graphics	Get a hand scanner for those small graphics.
		Typing's the best bet for short documents.
	Full-color Graphics	Some hand scanners handle color too.
		Large graphics need a flatbed color scanner.

ROI: The Credibility Gap

I know what you're thinking. Armed with the data from the preceding pages on return on investment, you can justify modems, OCR, or fax modems—or a cappuccino maker for the lunch room. But can you present the ROI numbers without blushing? Beware. These upgrades are potential credibility sinkholes. The ROI scenario plays like this: If I upgrade to a hotter-than-heck 28.8Kbps modem, I can save six minutes a day uploading my vitally important status report to corporate headquarters. My six-minute labor is worth $2.50 a day, which means the new $400 modem pays for itself in only 160 days. Sign me up.

There is one problem with this analysis: It doesn't always fly. Controllers heard this argument in the prehistoric days of computing when Paleolithic Geek wanted to buy VisiCalc for his Radio Shack Model 12. They often feel that individual savings (like the six minutes above) don't translate into savings for the business. Thus armed, let's look at the featured upgrades to see what a controller might say.

To see if a modem upgrade makes sense, do a little math, says the controller. Multiply the phone time saved by the phone tariff (usually in cents per minute). Then, add in the dollar value of person-hours saved. OK, fine.

Now, continues the controller, we see that upgrades to 28.8Kbps modems certainly make sense for niche use, as with large file transfers. But widespread upgrades? Ask what you're saving: work time—or coffee-break time?

Feel free to counter by saying that the bona fide savings will be apparent when more people use the Internet and desktop videoconferencing. The Internet's World Wide Web and videoconferences crawl at anything less than 64Kbps.

Got through that argument. Whew. How about the next one: The fax modem. Manual

TOP BUYS

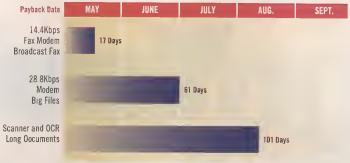
HOW THE **UPGRADES** COMPARE TO EACH OTHER

Bucking the Bang: Except for a few tasks, all the upgrades we tested showed an improvement in productivity. So the question is, which ones provide the most improvement for the lowest cost? In this chart, the upgrade/task combinations that are closest to the upper right give the most for the least. Those in the lower left do not offer compelling ROI reasons to upgrade. Of course, any upgrade that's used for more than one task is a better bargain.

faxing drives me nuts. The receiving machine is always out of paper. By the time I call to explain the problem and retransmit the fax, it's lunch time.

Fax modems, responds the controller are no day at the beach either. They can be slow, incoming documents may be hard to read, and the software can be daunting to learn.

Finally, there's OCR. As a rule, you argue, OCR makes sense for core business applications that are essential for serving customers. Insurance companies invented paper hell. They have done really well with OCR.



Wise Investments Pay Off: If you spring for a faster modem, a fax modem, or a scanner and OCR software soon, your investment will pay for itself by the end of the summer.

Once again, the controller has the answer: Justifying a scanner as a substitute for typing or paper filing is a stretch for the average office worker. By the time we get one person trained, they'll have moved on.

So make your case—but be prepared for the response. You may save enough money to throw away the hardware after a year, but your controller's going to think it's bogus logic.

MARC DODGE *is a telecommunications department manager without a fax machine.*

Ten More Ways to **Save**

Modems, Communications Software, and More

Powerful Computing: Making your computer into a communication and organizational tool is easy, and not that expensive. For less than $500 you can find an easy-to-use solution to enhance your productivity without giving yourself a headache (or breaking the budget). In addition to the three technologies examined in this story—modems, fax modems, and scanners with OCR software—consider communications software and a font manager as good candidates for a high return on investment. A backup system may prove to be worth its weight in gold if you lose crucial files. The other technologies cited here may be slightly trickier to install or use, but they also increase productivity.

	Low Cost (less than $100)	Easy to Install and Configure	Easy to Learn and Use	Easy User Support	Cost
28.8Kbps Modem Shorter phone calls can make savings add up fast.		✓	✓	✓	$420
Fax Modem The fax machine's often the biggest office bottleneck.		✓	✓	✓	$190
Scanner and OCR Software Don't rely on your own clumsy typing.		✓	✓	✓	$450
Remote Control Software Dial in to stay in the loop.	✓				$90
Internet Front-end Software Know what's going on online.	✓				$80
Font Manager A simple tool to boost productivity.	✓	✓	✓	✓	$80
Document Manager Bytes are easier to search than piles.					$350
Backup System For petty cash, you'll save your life.		✓	✓	✓	$250
Communications Software The skeleton key to the online house.	✓	✓	✓	✓	$80
Cross-platform Document Sharing Software No paper costs.		✓	✓	✓	$150

Harness the Power of Desktops and Telephones

Your PC

SYNOPSIS

LINE DANCING: *Making the workgroup more productive.* **152**

IT'S FOR YOU: *Boosting your personal productivity from the desktop.* **158**

PICK UP THE PHONE: *Will PCs and telephones ever become one?* **162**

WHAT'S ON TAP(I)? *Microsoft's telephony API vs. Novell's.* **164**

Picture this: You're talking to your boss about the upcoming national sales meeting when the second line on your phone lights up. You're reluctant to cut your boss off, but this call could be crucial. If only you could answer your second line without disturbing your first so you could find out whether it's your most important client calling to seal the deal or some nitwit trying to sell you soybean futures.

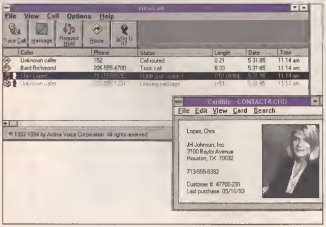
Even though this is the nineties, your telephone seems only a little more sophisticated than Alexander Graham Bell's: Either interrupt your boss or let that juicy commission slip away—or you could be one of the technologically advantaged whose PC tells them who's calling.

Computer telephone integration (CTI) harnesses the power of your PC to the ubiquity of the telephone, and the result is a whole that's far greater than the sum of its parts. Your telephone provides your PC with the incoming caller's phone number, and your PIM uses that number to find a contact file and pop a note—complete with the contact's history—on your screen. Now you can safely tell your boss that there's a big fish on the other line waiting to be reeled in, and he or she will be happy to hold.

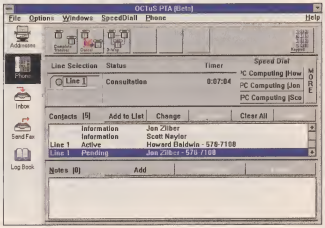
CTI? You grimace. That's no revolution. That's been promised for years, just like ISDN. True, but what's changed are the players now behind CTI. It's no longer the exclusive domain of expensive, proprietary equipment and custom software. Now Microsoft, Novell, Intel, and AT&T are leading the charge to make CTI affordable and easy (or at least easier) to use.

Just as they once killed proprietary desktop

CAN'T TALK NOW: Active Voice's TeLANophy lets you give your incoming callers appropriate greetings when you can't take their calls. Clicking on the road-sign icon lets you transfer the call to someone else.



THE RIGHT CONNECTIONS: Call management applications like Octus's Personal Telecommunications Assistant eliminate the hassle of setting up conference calls. Just click on a name to add them to the conversation.



Is Ringing

publishing and word processing systems, off-the-shelf PCs are now gunning for proprietary Private Branch Exchange systems (PBXs). In an ideal world, telephony application developers will be able to write one application, then use a hardware driver to communicate with the PBX—just as printer vendors provide drivers for their hardware. And that ideal world isn't so far away. Not only are computer industry behemoths pushing to make the phone system the most powerful peripheral your PC ever had, but PBX vendors are beginning to open up their proprietary interfaces to link their equipment into burgeoning computer networks.

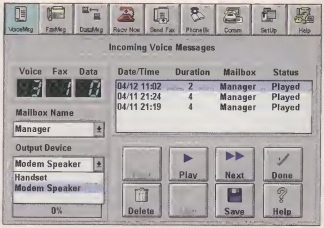
As you might expect, Microsoft and Intel are taking the desktop route to CTI—directly linking one phone to one PC. On the other hand, Novell, the preeminent network vendor, and AT&T, the number-one phone system vendor, are taking the back-end approach by linking the PBX with network servers. Not to be left out, second-ranked PBX vendor Northern Telecom is working on a way to link applications based on the Microsoft-Intel solution with those based on the Novell-AT&T solution.

Whether it's a hard-wired or virtual connection, the potential power of CTI seems limitless, and caller identification is only the tip of the iceberg. Imagine being able to call your PC from any phone and hear your e-mail, send a fax, or change your schedule. Or imagine being able to use your PC to set up conference calls, manage your voice mail, or forward calls with the click of a mouse button.

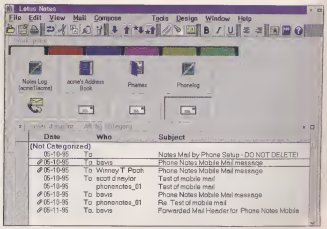
For a single user, the rewards include better time management and boosted productivity. But CTI has even greater implications for businesses. Call center applications that take advantage of both telephony and database information—for example, retrieving the customer record of an incoming caller and downloading it to the PC of the representative who takes the call—can save a business time and money while improving customer relations.

With the major players working toward a standard approach to CTI, you'll see more and more of these applications aimed at melding the PC and telephone to improve the productivity of individuals and groups. In the following pages, we'll take a look at some of the problems facing users at both the desktop and the departmental level and report on our experiences setting up some of the trend-setting applications that purport to alleviate your productivity predicaments. We'll also take a look at more solutions that are on the way and give you a sense of how long it will be before you'll be saying, "The PC's for you."

BY HOWARD BALDWIN



LISTEN TO THIS: When voice messages come in to Pacific Image's SuperVoice Pro, they're saved in your own mailbox and their duration is displayed in the client software; click on one to play it either through the handset or the voice modem.



REMOTE CONTROL: Lotus's Phone Notes Mobile Mail lets you pick up a phone and call your server to have your e-mail read to you. When you return to the office, you'll be able to see what you've already heard.

Dial N for Network

Chances are that somewhere deep in the guts of your office there are at least two metal boxes that cost some multiple of $10,000. These boxes continually pump information and are crucial to your bottom line. One is your PBX, and the other is your network server. The one thing they generally don't have in common is the ability to talk to each other. That's bad news if you're trying to wring the last bit of productivity out of your technology and the people who use it.

Telephony applications can link your PBX and server to boost productivity in several ways. Some (known as *call center applications*) identify callers and can pull up relevant statistics about the caller, to which you can add notes about the current call; if you need to transfer the call, you can then also transfer the entire data record. Others integrate e-mail, voice mail, and fax and deliver it to you in a single mailbox; still others enable you to call up your e-mail from any telephone and have it read to you; and there are those applications that will track your outgoing calls and block calls to restricted numbers.

Take a call-center scenario in any customer-service organization. The software takes an incoming call and identifies who it is before it's routed to one of your employees. This can be accomplished through either caller ID (which, if the FCC has its way, will be available nationwide by the time you read this) or interactive voice response (IVR). With the latter, the caller uses the telephone keypad to input his or her account number. Either way, a database then looks up the customer's account so that the representative has a sense of what the customer might be calling about.

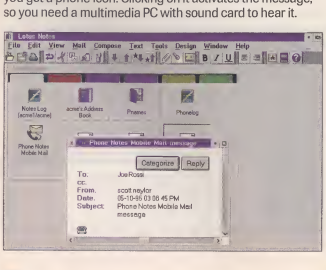
Say it's a policyholder calling about an insurance claim that's been denied. In a fit of frustration, the customer demands to be transferred to a supervisor. The supervisor's phone will ring, and her monitor will show not only who's calling but also updated notes related to the conversation. The exasperated customer doesn't have to repeat everything that's already been said, and the supervisor doesn't have to hear it all in order to solve the problem.

This is no different from what happens with old-fashioned custom-built call-center applications, but with CTI standardization driving the cost of these applications down, workgroup-based call centers for even small regional sales crews and internal technical support staffs are now financially feasible.

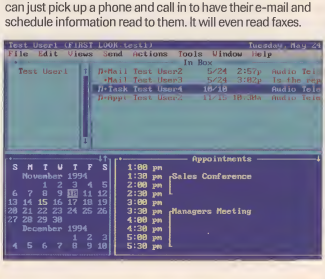
Other LAN-based applications, such as Active Voice's TeLANophy or AnswerSoft's SoftPhone 1.1, manage the overwhelming influx of faxes, voice mail, and e-mail coming to your desk. By linking the PBX and the network server, these programs can let you view your faxes and voice-mail messages in the same in-box as your e-mail. You can click on the subject header, hear what the message is about, and listen to it, delete it, or forward it to the correct person.

Instead of using your computer to access your phone, you can convert text to speech and use your phone to access your computer with special additions to groupware applications like Novell's GroupWise and Lotus Notes. Both programs let you dial in using any telephone to hear your e-mail, update your schedule information, and create and send voice mail. While the convenience

SOUND OFF: When you access your voice mail through Lotus's Phone Notes Mobile Mail, instead of a text message you get a phone icon. Clicking on it activates the message, so you need a multimedia PC with sound card to hear it.



TALKING MAIL: By adding a telephone access server between PBX and network server, Novell's GroupWise users can just pick up a phone and call in to have their e-mail and schedule information read to them. It will even read faxes.



Automatic call distribution (ACD) takes an incoming call and routes it to the appropriate representative on your staff.

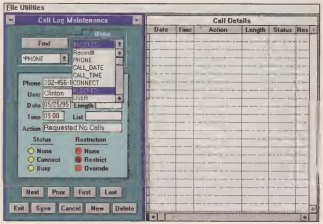
Using **interactive voice response** (IVR), the caller inputs information such as her account number or a specific request using her telephone keypad. The application searches your database for the customer's record, which pops up on your staffer's screen so that detailed information can be input. Once the staffer has finished assisting the customer, he can use **call transfer and screen routing** capabilities to forward both the call and the information to another representative if necessary.

Automatic Call Distribution Expensive, custom-built ACD applications have been used by airlines, hotels, and insurance companies for years. In general, these systems require either a very intelligent (and expensive) PBX, or a PBX that's closely coupled with a minicomputer such as an AS/400 or a Unix system. Newly standardized telephony applications will lower the cost of setting up call centers for use by employees and/or customers.

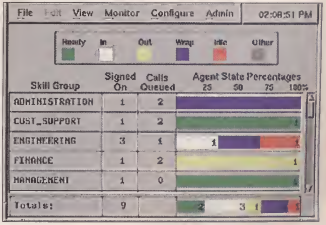
Interactive Voice Response Through IVR, a recorded voice asks customers to input specific information using the keypad of the telephone. This lets the application identify who's calling and properly route the telephone call. Many banks and credit card companies offer IVR systems so their customers can call in for account balances and recent transactions without having to interact with the companies' employees.

Call Transfer and Screen Routing The phone call at this point has two components: the call itself and the information associated with it. If the customer needs to talk to a supervisor or another representative, both pieces of information can be forwarded. That way, precious time and good will aren't wasted by forcing the customer to say everything again.

DON'T TOUCH THAT DIAL: Page Telecomputing's Sales Call Restriction Software lets you block calls to certain numbers. That way new employees don't make sales calls to folks who have proven to be deadbeats in the past.



CALL WAITING: Within Teloquent's Distributed Call Center application are real-time tables that let the network manager see how the number of calls queued up matches the number of employees on duty to help them.



is somewhat offset by the telephone's limited interface—forwarding a fax can quickly turn into a game of finger-twister—it's still the most accessible way to stay on top of what's going on in the office while you're on the road.

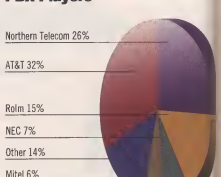
Information management is another big advantage of linking the PBX to the server. Products such as Teloquent's Distributed Call Center and Page Telecomputing's Sales Call Restriction Software will help you control incoming and outgoing calls. Distributed Call Center's software tracks how long calls are taking and how long callers are being kept on hold, thereby giving you a general picture of how efficiently your call center is handling incoming calls.

Sales Call Restriction Software takes the opposite stance by controlling outgoing calls. It was inspired by laws instituted in Florida, Texas, and Oregon that require telemarketing companies to purchase a database of citizens who don't want to be solicited. If a company calls one of these people, the state can levy a fine of up to $10,000. In addition to blocking the phone numbers on the list, the software also lets you flag deadbeats or problem clients in your database so that a new employee doesn't start prospecting someone who's given you trouble in the past.

We installed and evaluated several of these products. As you might expect, they are not trivial to set up. SoftTalk's Phonetastic call processing system, for example, took us several hours and multiple tech support calls to get running with our switch and Novell server, though the software itself was easy to install. However, that was nothing compared to the 16 hours it took us to set up a Notes server, install the custom hardware, and configure the Phone Notes Mobile Mail software. And once we got it set up, it worked for only about 20 minutes. After reinstalling the software several times on Lotus's recommendation, we finally figured out the problem, which was due to an omission in the documentation. If Phone Notes Mobile Mail is any indication, you may find technical support hard to come by.

The standardization that's sweeping the PC-based telephony industry is still in its earliest phases. When you go shopping for these applications, you'll still encounter sticker shock and other problems. Aside from the technical difficulties involved in setting up these programs, you should also consider how to get your MIS and telecom departments to work together. Historically they've been separate and autonomous enclaves of technology, and either or both might resist ceding any authority.

PBX Players



SOURCE: DATAQUEST

Family Bell: You must know your PBX make and model to use any sophisticated PC telephony system.

Call Manager / Q.Sys / (513) 745-8070 / price varies / *Reader Service No. 739*

Distributed Call Center / Teloquent Communications / (508) 663-7570 / $2,500 to $3,000 est. street price / *Reader Service No. 740*

GroupWise / Novell / (801) 321-4566 / $695 est. street price / *Reader Service No. 741*

Phone Notes Mobile Mail / Lotus / (800) 346-1305 / $12,000 est. street price for 200 users / *Reader Service No. 742*

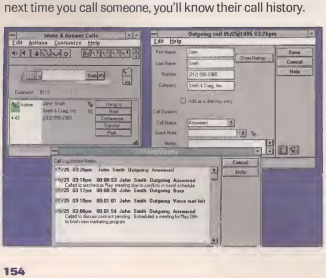
Phonetastic / SoftTalk / (617) 482-5333 / $2,495 for 10 users, $62,495 for 500 users (through dealers only) / *Reader Service No. 743*

Sales Call Restriction Software / Page Telecomputing / (800) 224-5964 / $64 to $195 est. street price / *Reader Service No. 744*

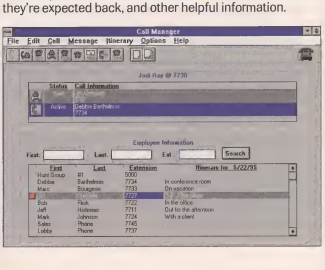
SoftPhone 1.1 / AnswerSoft / (800) 896-2677 / $220 est. street price / *Reader Service No. 745*

TeLANophy / Active Voice / (206) 441-4700 / $50 to $200 est. street price / *Reader Service No. 746*

MAKE NOTE: Click on a button to call someone, then sit back as AnswerSoft's SoftPhone logs the call, even giving you the chance to make a few notes along the way. The next time you call someone, you'll know their call history.



WHO'S ON HOLD? Q.Sys's Call Manager lets third parties monitor who's doing what with their phones. A receptionist, for example, can let a caller know where people are, when they're expected back, and other helpful information.



IT'S NOT IF. IT'S WHEN.

486, Pentium, PowerMac...

No matter how fast your PC is, it can't outrun a power problem

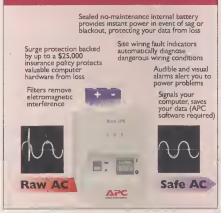
(Get Uninterruptible...starting at $119)

Just don't have the time for power problems on your PC? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes.

IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

In fact, you have better odds of winning the lottery than of escaping the sting of power problems on your PC. One study discovered a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse. And since sags and blackouts represent more than 85% of power problems likely to hit your computer, standard surge suppressors are literally powerless to protect you. And a study in a recent *PCWeek* showed that the largest single

APC UNINTERRUPTIBLE POWER MEANS SAFE DATA, HAPPY COMPUTERS



APC Uninterruptible Power Supplies provide instant battery backup to protect your data from loss and your hard drive from damage. Units are even backed by up to $25,000 in lifetime surge protection insurance.

OVER 3,000,000 SATISFIED APC USERS...

"This is the best computer related purchase I have ever made! Has saved me hours of re-programming..."
Carol Irvine, Wizard Assoc.

"We reduced our maintenance costs the first year by 50% in repairs of equipment."
Valentin Gonzalez, Pfizer

"Our server was running a project when it lost power... messed up all the data files. It took four days to recover. But we don't worry anymore since we got APC..."
Tony Chen, DeAnza Systems

"We were working on a state bid when the power went off. APC saved the day and year and future...about 800 pages of data saved thanks to APC."
Ravi Iyer, Software Galleria

"A power surge did significant damage to all of our systems except those protected by APC. The APC units were undamaged..."
C. Jeffrey, C. Jeffrey Eng.

"APC has virtually eliminated downtime in our ..."
...le Corp.

...while ... If not for ...e had a ...
...l Inc

Home office user Don Traux knows first hand about APC reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked."

"APC lets me sleep better at night. How much would you pay to get back that one file you worked all day to complete for the boss who gets on the plane at 8:00 a.m? You should assume that you'll buy a UPS, not that it's some luxury item."
R. Morella, Westinghouse

"A power surge wiped out the FAT tables on all PC's not protected by APC. Now have APC installed on all..."
Craig Post, Comm. Tech.

"Before I purchased the UPS I had to put in at least two hard drives at $1000. With APC products...no new hard drives in two years!"
S. Foreman, LSP

FREE 60-pg Power Solutions Handbook

No matter how fast your computer is, it will never outrun a power problem...so get your FREE handbook today!

What are the myths and musts of PC protection? What are the 10 most common power protection mistakes? The top tips for adding reliability to your LAN? Get your FREE copy and find out!

☐ YES! I'm interested in learning more about APC UPS protection. Please send the name of my nearest dealer.

☐ No! But I would like a FREE Handbook.

Name _____ Title: _____

Company _____

Street/City/State _____

_____

Phone/fax: _____

Brands of UPS used? _____ # servers/PCs to be protected? _____

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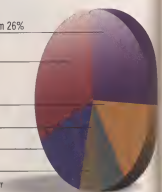

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Family Bell: You must know your PBX make and model to use any sophisticated PC telephony system.

Call Manager / Q.Sys / (513) 745-8070 / price varies / *Reader Service No. 739*

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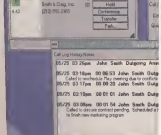

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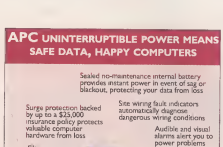

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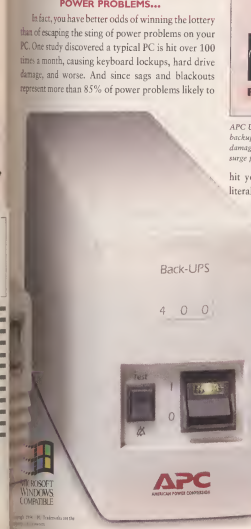

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Coming and Going

You probably use your PC and telephone more than any other two devices in the office. Imagine what you could do if you could link these two desktop devices together, essentially making the phone a peripheral to your PC. This is what desktop-based telephony applications do, and they can automate everything you do that relates to incoming and outgoing communication.

At the very simple end are such solutions as Global Village's FaxWorks, a $39 product that works with a voice modem. (Voice modem is a bit of a misnomer: These are really modems with sound recording and playback capabilities—a kind of integrated modem and sound card.) FaxWorks acts as a universal switchboard: When a call comes in, the modem determines if it's a voice, data, or fax call, and activates the appropriate part of the software. For fax and data, FaxWorks operates pretty much as you'd expect. In addition, it can turn your PC into a voice-mail system. Calls come in and FaxWorks asks callers who they're trying to reach, then uses interactive voice response to determine which of your mailboxes to route a call to. At that point, FaxWorks can play a personal voice mailbox message, or go to another level of voice menu.

Some of the tasks of desktop-based telephony applications are no different from server-based telephony applications—for example, caller ID that originates in a PC looks pretty much the same as caller ID from a server. Whether you invest in a personal system or a network system depends on how frequently you share phone information with others.

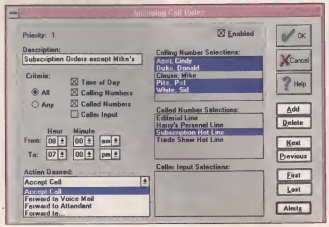
If you tend to work on your own—for example, either at home or in a small office—a software-based telephony application can mean the difference between the telephone controlling you and you controlling the telephone. Here's an idea of how it can work: Say you're developing a contract proposal and are waiting for a colleague to call in with some additional data. You don't want that call to be put into voice mail, but you have to use the telephone line. Call processing software solves this dilemma by popping up a window on your monitor that tells you another call is coming in. If the call originates from someone whose telephone number is already listed in the software's contact manager, the caller's name and number will be displayed. At this point you have the option of taking the call or routing it to your voice mail. If it's a fax rather than a voice call coming in, you'll be notified of that as well so you can route the call directly into your fax system.

The only drawback of desktop call processing packages appears when someone whose number is not listed in your contact manager calls—a window that says "incoming caller unknown" is not very informative. But the software still keeps track of calls for future reference so you can, for example, identify patterns in where calls are originating—by region, for example.

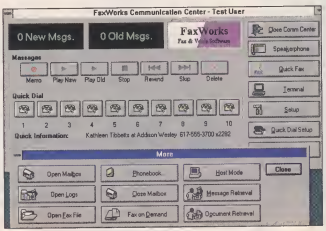
Be aware that in general you're not using the information already in your PIM or contact manager—you're using the data in the call processing package. Check the import capabilities of the package to see how easy it will be to transfer the contact information you already have into it. At the very least, it should accept data in comma-delimited format.

For outgoing traffic, call processing

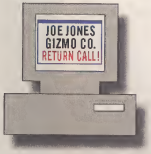
ON AUTOMATIC: Aurora Systems' FastCall can direct a caller to the right place without even requiring them to punch a number. Using caller ID, the software determines who's calling and uses rules to figure out what to do with them.



SIMPLE SOLUTION: With a voice modem, Global Village's FaxWorks can turn your PC into a mini phone center, capable of sending and receiving faxes, as well as storing voice mail and dialing the phone. It has up to 1,000 voice mailboxes.



Call-processing applications on the PC take incoming calls through your fax-data modem. They register the incoming telephone call's number using **caller ID,** then check the software's contact information to see if the number is already there. The application then triggers a **screen pop,** a window that tells you who's calling, on your monitor. Within the window, you'll have options for handling the call—you can either send it into voice mail or take the call. To actually hear the new voice mail, you'll need a **sound card and speakers.**



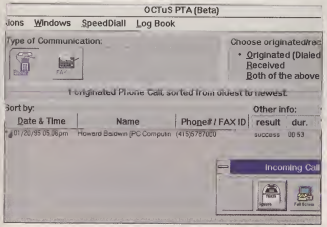
Call-Processing Applications These are boons for time management and productivity because they substitute the PC's graphical interface for the telephone's obscure 12-button keypad. Thanks to caller ID (now available in most states, but not California), they can identify incoming callers as well as simplify conference calling. Be warned, though: Callers may find it eerie to be greeted by name before they've said a word.

Caller ID Also known as automatic number identification (ANI), caller ID lets you see who's calling before you pick up the phone.

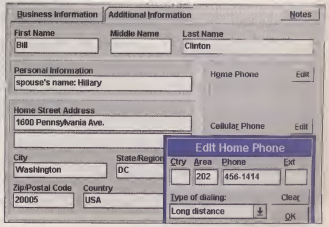
Screen Pop This is a simple term for a simple concept. If you're already on the phone, having a window pop up and tell you who's on the incoming line—your boss or your mother—helps you determine whether or not to put the first party on hold. It can also display other reminders about the caller from the software's contact manager (it works just like a stand-alone PIM).

Sound Card and Speakers After all this sophisticated technology, it's up to your lowly sound card to actually make everything work. You can use a microphone and speakers attached to your sound card to turn your PC into a fairly decent speakerphone.

BILLABLE HOURS: Keeping track of who you called and how long you talked is a lot easier with the logbook in Octus's Personal Telecommunications Assistant. And when someone calls you, the Incoming Call icons pop up.



PICK A NUMBER: Once you've put your contacts' business information into Personal Telecommunications Assistant, you can click on the next tab and add personal information, home phone numbers, and cellular telephone numbers.



software replaces the 12-button keypad of the telephone with an interface that offers more flexibility. First of all, it eliminates the problem of misdialed numbers, which can waste time and money in long-distance changes.

You can also use a call processing application to set up conference calls without relying on the operator or trying to do it yourself and feeling like an idiot while you repeat, "Still there?, Did I lose you?" With this software, creating a conference call is as easy as clicking on names in the contact manager.

This pays off in terms of productivity because suddenly you're relieved of onerous time-keeping and administrative tasks. If you're an accountant, architect, attorney, or other professional who bills by the hour, you have an exact record of who you talked to, when you talked to them, and how long you talked to them. You can take notes of your conversations as they occur and store these notes in your clients' records. No scribble first, transcribe later. And the same applies to faxes you send. All told, you end up with more accurate records and billing statements.

To test these applications for individuals, we set up Pacific Image Communications' SuperVoice Pro software for incoming call management and Octus's Personal Telecommunications Assistant for processing incoming and outgoing calls (other products to consider include Clearwave Communication's Intellect, Centigram Communications' OneView, and Smith Micro's Hotline). Both SuperVoice Pro and Personal Telecommunications Assistant were simple to set up compared to the network-based applications, which gave us server and PBX integration headaches.

What will make the difference in setup time with a desktop package is whether it uses a sound card in conjunction with a fax/data modem or one of the new voice/fax/data modems from Boca Research, CalCom Products, or Computer Peripherals.

Bundled with the SuperVoice Pro software is a Powercom America voice/data/fax modem. Total installation time was under 30 minutes, and that included a trip to the soda machine. In contrast, the biggest hassle we had with Personal Telecommunications Assistant was configuring the sound card under Windows. But the extra effort has a payoff: It had superior sound quality when we played back messages.

SuperVoice Pro's overall capabilities were impressive. You can use it to set up a PC-based post office of up to 1,000 mailboxes for voice mail, fax-back services, and bulletin-board support. It also lets you handle fax forwarding from the desktop and remote fax retrieval from a remote telephone.

While Personal Telecommunications Assistant can be used as a stand-alone call processing program, it can also be linked into PBXs for greater flexibility. We liked being able to point and click on names in the contact manager to set up a conference call, and its logbook gave us an easy listing of all phone calls and outgoing faxes. If your work or cash flow depends on billable expenses, this is a boon to accurate statements. Our only quibble, besides the sound-card hassle, was that fax reception isn't automated—your mailbox greeting will have to remind callers to press the Star and Pound keys to send faxes.

If you're looking for better time management without a lot of installation hassles, a desktop call processing application may be your ticket to a boost in productivity. Prices for them range from about $100 for incoming call handling up to $500 for incoming and outgoing call processing. But if you make a lot of phone calls, you'll quickly recoup the cost by saving time, dialing accurately, and by improving your efficiency and responsiveness with callers.

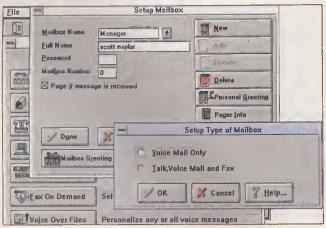
FastCall / Aurora Systems / (508) 263-4141 / $1,100 est. street price / *Reader Service No. 747*

FaxWorks 3.0 for Windows / Global Village / (800) 432-9967 / $39 est. street price / *Reader Service No. 748*

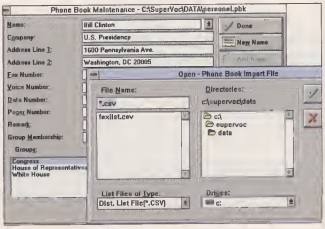
Personal Telecommunications Assistant / Octus / (800) 634-8248 / $179 est. street price, plus $59 each for fax and voice-mail modules / *Reader Service No. 749*

SuperVoice Pro / Pacific Image Communications / (818) 457-8880 / $100 est. street price / *Reader Service No. 750*

HIS MASTER'S VOICE: Pacific Image's SuperVoice Pro software lets you create mailboxes on your PC for either voice mail alone or voice mail and faxes. The Setup Mailbox shows you how to choose greetings and transfer calls to pagers.



INPUT DEVICE: Importing your contact lists into call management applications like SuperVoice Pro requires you to save them in comma-delimited format first, then save them in the applications' own telephone book.



Alexandre Patty had a rather distinctive approach to descending a staircase. Since he obviously preferred doing things the hard way, he probably wouldn't have been interested in faxing with Delrina WinFax PRO.

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What's Ahead for PC-Based Telephony Applications?

Call Forwarding

Dante didn't know it, but there's a special circle in hell reserved for anyone who labels 1995 the Year of Telephony, the same way some patron of Satan labeled 1985 the Year of the LAN. Yes, computer-based telephony is moving forward, but many of the improvements we're seeing are in advanced programming interfaces (APIs), not in user-oriented products. That means you can expect vendors to begin creating lots of products that will likely be completed some time in 1996 or later. Some analysts are forecasting a twenty-fold growth in the PC telephony industry's sales by 1999. With the market growing that fast, you can expect some great products in a few years.

What will those products look like? Nobody can say exactly, but some are forecasting what they *won't* look like. Don't look for a hybrid of phones and PCs. "Some people are wrestling with adding more stuff to the phone," says Gary Andresen, principal analyst for Dataquest in San Jose, adding that he doesn't see the logic for fancy phones or devices that combine the phone and PC. "People are still going to want something they can use as a phone when the computer isn't on."

The network-based call processing and call management applications we evaluated may be Plug and Play some day, but based on our testing of a few representative products, they're far from it now (we were more pleased with the installation ease of the desktop apps).

Two different APIs have been proposed to help solve the ease-of-use problem. TAPI focuses around the desktop computer; TSAPI focuses on the network and the PBX. So you have two competing standards in a very young market, and which one vendors choose to implement could very well mean the life or death of their products. In case you're interested in how the market's going to shake out, at least 42 companies have committed to developing TAPI-compliant applications, according to Microsoft. They include Octus, Stylus Innovations, Digital Equipment Corp., Northern Telecom, and Q.Sys. According to Novell, more than 100 companies have committed to developing TSAPI-compliant products,

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	Outbound	Transparent faxing, call tracking, automated dialing: Q.Sys's Call Manager, Aurora System's FastCall.
Remote Computer	Inbound	Single mailbox for voice mail, faxes, and e-mail: Lotus's Phone Notes Mobile Mail, WordPerfect's GroupWise.
	Outbound	Automated dialing, improved ease of use: Global Village's FaxWorks, Octus's PTA.

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including the five PBX vendors that make up 86 percent of the telephone switch market, as well as Answersoft, Aurora, Active Voice, Applied Voice Technology, Q.Sys, and SoftTalk.

They may have committed to the standards, but who knows if they're implementing them properly. According to our sources, few products are completely compliant with the Microsoft/Intel TAPI standard or the Novell/AT&T TSAPI standard (see "At a Glance," at right). Look for an influx of compatible boards and applications throughout the rest of this year. But be aware that with a fragmented PBX market, it may also take a while for all the server-based applications—especially ones from smaller developers—to work with all the vendors' switches.

PC-based telephony is still new enough to have pricing conundrums, and users should prepare for sticker shock. Novell charges royalties for applications built with TSAPI. PBX vendors will require you to upgrade their systems to make them TSAPI compliant. Even TAPI-compliant boards will cost around $300, and that doesn't include upgrading PCs to incorporate multimedia capabilities.

"We're searching for the killer app and the killer way of selling it," says Harry Newton, a telecommunications industry guru who runs two magazines and a trade show devoted to computer telephony. "[The CTI industry] doesn't have a predefined way of doing business that includes pricing and distribution." It's a historical problem, says Newton. He points out that every time a computer-industry giant has bought a telephone company (say, IBM acquiring Rolm) and vice versa (say, AT&T acquiring NCR), they've lost money.

Eventually pricing structures will shake out, Newton predicts, as will all the other industry stumbling blocks. As for the technology issues, some questions still remain. For instance, how will the incorporation of Radish Communications' VoiceView technology in Windows 95—as well as other standard simultaneous voice and data (SVD) protocols—affect applications? While no one has an ideal SVD solution, these protocols allow the marriage of your phone and PC through the modem—no internal boards or back-end PBX-to-server connection required.

Some application questions remain as well. For example, although there are personal dictation applications that can translate 50-plus spoken words a minute into text, it will probably be at least two years before you get speech-to-text translation capabilities in applications so that you could conceivably have voice mail faxed to you. It will be at least that long before you'll be able to program intelligent agents to route incoming mail, phone, and faxes based on the content of the message, determining who should receive the message or how urgent it is, as well as where the recipient is, and what hardware and network they're currently plugged into.

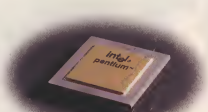
Perhaps the only certainty in all of computer-based telephony is that neither the telephone nor the computer is going away. As a result, they're going to have to learn how to coexist and leverage each other's strengths for the benefit of the users who have to deal with both.

AT A GLANCE

BATTLE OF THE TELEPHONY PROTOCOLS

No surprises here: Microsoft and Intel have developed the Telephony API (TAPI) because they see PC-based telephony as a desktop-to-telephone connection, while Novell and AT&T have developed the Telephony Services API (TSAPI) because they see PC-based telephony as a server-to-PBX connection.

What hardware and software do you need?	Like most desktop call processing applications, TAPI programs will work with sound cards and fax/data modems, or with fax/data/voice modems alone. The cards and modems will have to be TAPI compliant. The TSAPI applications will run as NetWare Loadable Modules, using TSAPI-compliant boards that will be installed in the server.
What are their drawbacks?	Installing TSAPI applications could become expensive because of the licensing fees Novell is charging for NetWare Telephony Services; also, you'll have to upgrade your PBX to use TSAPI drivers. TAPI applications, on the other hand, focus only on connecting the desktop to the phone, not to the PBX, which makes it difficult to take advantage of network-based call processing applications.
Can they work together?	Northern Telecom, maker of one quarter of all the installed PBXs, has developed a protocol called Tmap (for telephony mapping) that will enable TAPI-compliant applications on the desktop to communicate with TSAPI-compliant applications on the server. Other companies are developing TAPI-compliant boards for PBXs as well.
Are there other competitive protocols?	There's competition for the desktop-to-telephone connection. Last November, Apple, IBM, AT&T, and Siemens Rolm Communications announced that they were working together to develop specifications for both desktop-to-telephone connections and server-to-PBX connections. The latter were to be based on TSAPI, but the former would compete with TAPI. Microsoft and Intel were reportedly not asked to contribute to the consortium's specification.



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FOR MORE INFORMATION OR THE NAME OF A RESELLER NEAR YOU.

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VISUAL TECHNOLOGY

*HP COMPUTING, 11/94. IMAGINE IS A TRADEMARK AND HAWKEYE IS A REGISTERED TRADEMARK OF NUMBER NINE VISUAL TECHNOLOGY. ALL OTHER TRADEMARKS ARE THE PROPERTIES OF THEIR RESPECTIVE OWNERS. ©1995 NUMBER NINE VISUAL TECHNOLOGY

Circle 150 on reader service card.

101 Best Net Bets

SYNOPSIS

INDUSTRY SCOOP: *Want price points and farm activities from the Department of Agriculture? Plan to do business in Norway?* **168**

MONEY: *Wonder if you're on someone's list for bounced checks?* **170**

TRENDS: *Hear Scotty say, "I'm givin' you all she can take Captain! She can't take no more."* **172**

MAGIC BULLETS: *Pinpoint the best of the best online.* **174**

REALITY BYTES: *Find out where Dilbert cartoonist Scott Adams hangs out on the Net.* **176**

Looking for love in all the wrong places? What about information? What's true about love goes ditto for data—it's hard to find. There's a sea of information available online, but with more than 2 million sites on the Internet, how can you possibly find what you're looking for? Douglas Adams, author of *The Hitchhiker's Guide to the Galaxy,* puts it nicely: "The Internet is big. Really big. It gives the idea of infinity much better than infinity itself."

Sounds intimidating, doesn't it? Fear not. We'll help novice surfers get their feet wet, and help skilled surfers find waves they never dreamed existed. The following pages uncover more than 100 of the best places online—all overflowing with information.

What kind of information? To start with, we post locations you can visit to find out about what's important to you—your industry. Not only will you gain insights into your particular field, but you'll also pick up information such as tips on management principles and practices that can help you succeed in any industry.

Then we move on to the common denominator that essentially drives every industry: money. Uncover information about what to do with it, where to make it, and how to save it. You can also find out what's in store for currency in the future.

But the Internet is also about serendipitous surfing, so we list the sites that will keep you current with the latest trends, as well as let you in on the sites *PC Computing*'s editors visit most often. Keep up-to-date with your favorite television shows or learn more about chili peppers. And finally, we ask another Adams, Scott Adams, creator of the cartoon character Dilbert, where he goes to have a little online fun.

If you're overwhelmed by the number of sites listed, or if you know the kind of information you want and you just need to know where to find it, check out "Sites for Your Eyes" on page 174 to zero in on the sites that best fit your needs.

BY LIESL LA GRANGE AND NEIL RANDALL

A ELECTRONIC COMMERCE: Dial into companies or find tips on the best way to start your own.

B MONEY MATTERS: All the info on what counts most—from personal finance to investment strategies and economics, you'll find it.

C NEWS JUNKIES AND TREKKIES: No matter what your addiction, you can get your fix on the Internet.

D SCHOOL WAS NEVER LIKE THIS: Join Scott Adams to learn about history in a new way and take a virtual tour of the White House.

ILLUSTRATIONS BY TIMOTHY EDWARD DUNNE

A
CommerceNet
Welcome to CommerceNet
B
Personal Finance
CENTER
Perspectives
Internet Resources
What's Up
Dell
Corporate Information
Technical Support
International
FinanceNet
Information Overload: Get your fill of industry, money, and trend info.
STAR TREK
VOYAGER
File Edit View Go
Location: http://lcweb.lo
Guided Tour
The Lit
C
PATHFINDER
The Lion in Winter
Why Nobody Believed
People
D

Industry: From Accounting to Business in Zaire

Tricks of the Trade

The Internet serves up information on just about every kind of industry. Whether you earn your paycheck from telecommunications or teaching, there's something there for you. The Net doesn't discriminate by the size of a company or by job title—talk about your equal opportunity information provider.

5 AT&T
The father of all Bells makes it onto the Web with links to all sorts of company-related information, including details about AT&T's corporate vision, lists of agreements and alliances, names of board members, and details about featured products and services like the Flashport and TPS systems.
URL=http://www.att.com/

6 Nippon Telegraph and Telephone Corporation
U.S. telecommunications companies aren't the only such firms to hit the Net recently. Here's the huge Japanese version, complete with documents in Japanese, links to Japanese companies, noncommercial Japanese Web sites, and trade show news in Japanese.
URL=http://www.ntt.jp/index.html

7 Eli Lilly and Company
A large international pharmaceuticals company joins the Web with the promise of extensive details on research and products. You can't order drugs online, but you'll find documents about strategic focus and recent research discoveries, as well as a feedback mechanism to help guide the site.
URL=http://www.lilly.com/

10 CommerceNet
It's more than a shopping mall. It's an effort to make the Web suitable for big-business dealings, including access to Internet consultants and providers, a prototype for secure online ordering, and participation from large corporations. It's funded by corporations and is expensive to join.
URL=http://www.commerce.net/

8 The IBM Corporate Home Page
Big Blue has also found its way to the Web. Of course, there's the usual information about IBM products, services, and projects, but there are also hyperlinks to cool sites that cover the Louvre, White House, and even frog dissection. IBM encourages you to try out its multitasking capabilities with, what else, OS/2 Warp.
URL=http://www.ibm.com

9 Citibank
The technology-oriented banking giant features a Web site that underscores its high-tech reputation. Much of the site is under construction, but it looks extremely promising. There's a background on about the company itself, as well as details about specific products and services.
URL=http://www.ttt.com/

11 Business Information Resources
This site includes links to a number of others related to doing business online. It features a monthly magazine for people starting new businesses, a database offering support for new businesses, and links to free listings in consultant and telecommunications areas.
URL=http://sashimi.wwa.com/~notime/eotw/business_info.html

12 Khera Communications' Business Resource Center
You gotta start somewhere, right? These pages offer solid reading on establishing a new business, primarily in the form of online articles on starting and marketing a business. You'll also find a smorgasbord of interesting miscellaneous articles. For inspiration, there's even a quote of the week.
URL=http://www.kci.link.com:80/sbrc/

13 Social Security Administration Online
If you run a business, you need to know all about social security administration. Luckily, this government agency tells you all about it via an online hyperlinked handbook, speeches and papers about social security, statistical data, and searchable archives.
URL=http://www.ssa.gov/SSA_Home.html/

16 Arent Fox
Want to market that new, top-secret widget? Then consult the Arent Fox firm's Advertising Law Internet Site on the Web. It includes information about infomercials, home shopping, direct-response TV, and a listing of Federal Trade Commission guidelines and statutes to ensure smooth sailing with Uncle Sam.
URL=http://www.webcom.com/~lewcos/home.html

14 Small Business Administration
Has independent government agency exists to help small businesses, so why not take advantage of it? The site offers some extremely valuable links if you fit the requirements. Look for small-business development centers, financing information, and details on how to expand an existing business.
URL=http://www.sbaonline.sba.gov/

15 AskERIC Virtual Library
If you're an educator or any level who needs information, use the famous ERIC system from the Web. Find out how to use popcorn to make a reading book, or how to develop lesson plans for just about anything you can imagine. It's a great site for gathering ideas to inspire others.
URL=http://ericir.syr.edu/

17 Computer and Communications Co
Web Page (Lawrence Livermore National
This page is a good source of links to high-
firms. Visit Lockheed's Palo Alto Artificial
Intelligence Center, the Microsoft Research
ARPA (the government agency that spawne
Internet), McDonnell Douglas Aerospace, a
legendary Xerox Palo Alto Research Center
URL=http://www-atp.llnl.gov/companies.h

18 The Jason Project
NASA has several impressive items on the Web, but this might be the best of all. There's a full site from the 1994 expeditions to the Central American rain forest and Mayan ruins, invitations to future expeditions for students, plus descriptions and online discussion groups for teachers and students.
URL=http://seawifs.gsfc.nasa.gov/scripts/JASDR.html

19 Business Corporations
Companies tell their expertise and, in some cases, offer online catalogs. Find everything from auctions, apparel, and crafts to breweries, construction, industrial supplies, and motorcycles. There's even a section called Get Rich Quick for info on lotteries.
URL=http://akebono.stanford.edu/yahoo/Business/Corporations/

20 M-LINK (University of Michigan)
This well-constructed gopher links you to resources about business and management. There's considerable information on Total Quality Management. It's also a useful tool for international businesses. There's fascinating stuff on Zaire, for instance.
gopher to una.hh.lib.umich.edu:70/11/socsci/econ

21 Ricelnfo Gopher (Rice University)
One of the most complete sites around, this one is full of business and economics material. Visit the Statistics, Econometrics, and Computational Economics Collection, but be warned—it's not for the actuarially challenged. There are also archives of economics and investment newsgroups, such as mac.taxes. And you can access the Legal Information Institute, Cornell University Law School for dicsay legal questions.
gopher to riceinfo.rice.edu, then select Information by Subject Area, then Economics and Business

22 Economic Bulletin Board
Operated by the U.S. Office of Business Analysis, EBB offers finance-oriented files, such as statistics on just about any industry you can think of. There's even useful data on fertilizer. Check the huge archive on international markets, or a variety of trade possibilities—even used-clothing contacts in Latvia. When opportunity knocks, the quick get telnetting.
telnet to ebb.stat-usa.gov, log in as guest

23 Executive Branch, U.S. Government
This gopher site provides links to all the power players in several departments of the government. Retrieve details about price points and farm-related activities, Clinton's speeches, archives on security and technology, legal statistics, and educational and vocational material.
gopher to marvel.loc.gov, follow Government Information, Federal Information Agency, Information by Agency, Executive

24 Business, Economics, Marketing, University of Missouri, St. Louis
Uncover a wide array of information, such as International Economic Information Resources, Kovacs Guide to Internet Business Resources, U.S. Economic Information Resources, and Details from the U.S. Patent and Trademark Office.
gopher to umslvma.umsl.edu, go to The Library, select Subject Area Resources

25 Economic Democracy Information Network
This gopher site compiles information on the economic aspects of community development, economic conversion, and the environment. Get good, varied economic information on everything from the census to corporate reports, a link to the Economic Conversion Info Exchange, files on U.S. labor unions, and an occational listing of online resources in third-world nations.
gopher to garnet.berkeley.edu:1250/1

26 Norwegian Research Centre in Organization and Management
This research center concentrates heavily on welfare-related issues, but its overall strength is its economic basis. Consult lists of books, articles, and papers on economics. Find daily news reports on Norway, which could be helpful if you plan to do business there.
gopher to gopher.fos.uib.no

27 GoldSite Europe
This United Kingdom–based Web page points to a number of useful sites, including an excellent Internet search page. Other notable sites are Intra-Market, with links to directories for R&D, education, even music, several good publications on the Internet, and The Document Center, which delivers hard-copy reports related to government and industry standards.
URL=http://www.cityscape.co.uk

28 Open Market's Commercial Sites Index
Tap into the following corporate, nonprofit, and government links: the Financial Services Technology Consortium, the best site on the Web for details of the banking industry's responses to current challenges, several high-tech companies, including Hewlett-Packard, a great example of Internet-based news and support, and Venable, Baetjer, Howard & Civiletti, the first law firm on the Web, with information about business and labor law.
URL=http://www.directory.net/

29 Gopher Jewels
Perhaps the single best-known site on the Internet, Gopher Jewels organizes a huge range of gophers according to subject. Find a link to Patents and Copyrights; directories on manufacturing issues, from research to hardware; links to Net-specific information; employment-related sites; and virtual storefronts for commercial gopher sites.
gopher to gopher.cos.warwick.ac.uk:70/11/remote/other-gopher/Gopher_Jewels

30 U.S.-Japan Technology Management Center (Stanford)
A crucial site for any U.S. firm doing business in Japan, these pages can be found in the X-Guide to Japan Information Resources. Consult links to Japanese corporations, R&D firms, and governments; familiarize yourself with Japanese commercial concerns; develop an understanding of Japan's legal and constitutional systems; and learn about U.S.-Japan relations and policy.
URL=http://fuji.stanford.edu/

31 Total Quality Management Bulletin Board (Clemson University)
This BBS offers directories to many downloadable files. Sink your teeth into details on the National Performance Review, read studies of management principles and practices, investigate lists on what makes some firms synonymous with quality, and check out research and essays on leadership.
gopher to deming.eng.clemson.edu, select the Public File directory, then the TQM Bulletin Board directory

32 Nonprofit Organizations on the Internet
This site has superb collection of information about nonprofit organizations. Among those covered are Project America, the Colvid LaMacchia Defense Fund, InFact's Tobacco Industry Campaign, the League of Conservation Voters, Mother Jones magazine, and The Benton Foundation Communications Policy Project.
URL=http://www.si.mit.edu/people/eliens/hon.html

33 The Internet Tools Summary
This is the place to go if you want to know anything about the Internet. If you think Archie and Veronica belong only in a comic book, think again. Learn about "finger" and other Net-retrieval utilities, and get details on important Internet tools. Why tackle the Internet all by yourself?
URL=http://www.rpi.edu/Internet/Guides/decemj/internet-tools.html

Where PCC's Editors Hang Out

1 Literary Kicks
Take yourself back 40 years to learn more about (or relive!) the Beat Generation—lists of films, music, and information on your favorite characters.
URL= http://199.0.70.23/~brooklyn/LitKicks.html
Kyla K. Carlson, Associate Editor

2 WebMuseum, Paris
Experience Paris and the world's most treasured artwork from the comfort of your PC, sans the French attitude and jet lag. Enjoy a glass of wine and some brie while browsing and you're set.
URL= http://mistral.enst.fr/~pioch/louvre/
Liesl La Grange, Associate Editor

The Chile Gallery

3 The Chile-Heads Home Page
Wanna know why habañero peppers should be classified as lethal weapons? Wanna find others who believe that a bowl of five-alarm chili is the closest thing to heaven?
URL=http://chile.ucdmc.ucdavis.edu:8000/www/chile.html
Ed Bott, Senior Contributing Editor

4 The United States of America Home Page
Point to a state on the U.S. map and instantly find online information. Being new to California, I use this as my tour guide to the Golden State.
URL= http://sunsite.unc.edu/usa/usahome.html
Adam Meyerson, Technical Director

Money: Making the World Go 'Round

Data to Dollars

Money may indeed be the root of all evil, but lack of money—or lack of timely financial information—is the root of most of our business troubles. The Internet is overflowing with solutions to your financial woes, as well as information about how to make more money and keep more of what you make when tax time arrives.

34 FinWeb
Associated with ARIA, FinWeb provides links to a variety of financial resources on the Net and Web. It's particularly good for academic interest with two working papers series, links to several databases, and a link to Interactive Nest Egg.
URL=http://finweb.bus.utexas.edu/finecon.html

35 Chicago Mercantile Exchange
This multitrillion dollar financial marketplace hits the Web with a fairly creative site. It includes full background on the Mercantile Exchange and its activities, downloadable charts of activities and seat prices, and a glossary of futures-related terms. There's even a schematic of the Merc's model for financial regulation. Fascinating.
URL=http://www.cme.com/cme

36 American Risk and Insurance Association (ARIA)
ARIA's Web page offers information on the programs and services available to members of the Risk and Insurance Association. Among its offerings: a program of past and future meetings, full membership details, and links to other risk-based Web sites. There's even an application. Why not sign up?
URL=http://riskweb.bus.utexas.edu/aria.htm

37 Daily Stock Market Summary
A simple page that gives the current d... low, and closing stock prices. It lists s... company name. The reports are printable... downloadable. Updated daily at roughly ... (EST), it's available before the morning ... arrives. It's just the thing to start your d...
URL=http://www.ai.mit.edu/stocks/pro...

38 FinanceNet
Vice President Al Gore, the man who made the information superhighway hip and hyped, is at it again with this "we want your design help" service direct from the White House. There are links to financial documents and resources, Web and Gopher sites related to FinanceNet, mailing lists, and other discussion groups about FinanceNet.
URL=http://www.financenet.gov/

39 EDGAR Mutual Funds Reporting
An extremely well-designed fill-in form lets you choose the mutual fund you want, then press a button to show the performance results for a specific time period on your screen. Search a huge list of tracked mutual funds for current or past results, back to January 1, 1994.
URL=http://edgar.stern.nyu.edu/mutual.html

40 GNN Personal Finance Center
Part of the excellent Global Network Navigator site, the Personal Finance Center offers a number of its own features as well as links to other personal finance info on the Net. There are all sorts of money-related material, such as what's new in personal finance, a financial Q&A, and interviews with personal finance experts.
URL=http://www.digital.com/gnn/meta/finance/index.html

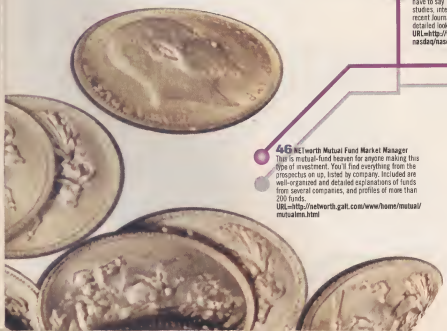
41 LawTalk—Business Law and Personal Finance
You need a sound card to hear the information in these files because they're all Sun audio files, but the topics are fascinating. Sit back and listen to information on bounced checks, details about the "lemon law," inspection of bank statements, and other uplifting pieces of trivia.
URL=http://www.law.indiana.edu/law/bizlaw.html

42 100% No-Load Mutual Fund Council
A full list of files that will walk you through information on mutual funds. Learn how you can ... a millionaire, with details on how to invest, information on mutual fund regulation, and how ... read the mutual fund tables.
URL=http://networth.galt.com/www/home/m... 100/100guide.htm

43 Consumer Information Center
This U.S. government organization produces and distributes information on consumer issues. Bundles of material are available on financial and other related issues: credit-card fraud information, federal credit-union details, and files concerning government agencies and small business.
URL=http://www.gsa.gov/staff/pa/cic/cic.htm

44 NASDAQ Financial Executive Journal
If you're serious about your personal investments, fire up this journal to learn what the stock market experts have to say. Search through case studies, interviews, and archives of recent Journal issues, and get a detailed look at financial strategies.
URL=http://www.law.cornell.edu/nasdaq/nasdtoc.html

45 QuoteCom
QuoteCom provides everything you need to maintain that monetary tension: newswires, stock guides, London and European market data, Hoover Company and other company profiles, and free accounts and premium subscriptions. You can get 15-minute-delayed quotes on more than 40,000 stocks, mutual funds, commodities, and more.
URL=http://www.quote.com/



46 NETworth Mutual Fund Market Manager
This is mutual-fund heaven for anyone making this type of investment. You'll find everything from the prospectus on up, listed by company. Included are well-organized and detailed explanations of funds from several companies, and profiles of more than 200 funds.
URL=http://networth.galt.com/www/home/mutual/mutualmn.html

47 Dow Jones Industrial Average
Why wait? Be completely up-to-date (within the last 5 minutes at least), about the market and this all-important average. The site includes a line chart updated regularly during the day, plus historical charts available as downloadable GIF files, and charts of data covering the past 25 years.
URL=http://www.secapl.com/secapl/quoteserver/djia.html

48 SEC EDGAR Database
If securities is your game, make sure you visit this site frequently. You can find fully up-to-date information from the Securities and Exchange Commission, custom filing and retrieval tools, full EDGAR documentation, and searchable EDGAR archives.
URL=http://www.hal.org/edgar/edgar.html

49 Experimental Stock Market Charts
Want a visual record of exactly how your stocks are doing? This site currently lists almost 400 stocks sorted alphabetically by company, with graphs that show the past year's performance. The site provides FTP links to full data files, plus news, highs, and volume summaries.
URL=http://www.ai.mit.edu/stocks/graphs.html

50 NETworth
A cool name and cool site tailored to investors, it features an attractive (if modem-hostile) full-color home page, financial news service, and complete information on mutual funds. Download no-load mutual fund information and get a free mutual fund market manager for account holders
URL=http://networth.galt.com:80/

51 Security APL
A thorough Web-based service, Security APL offers a range of electronic services for tracking businesses. Look at the quotes page with up-to-date news snippets of market behavior and quotes provided by North American Quotations. Just enter a stock symbol in the fill-in form to get current info.
URL=http://www.secapl.com/secapl/Welcome.html

52 Internal Revenue Service
Uh, good—something to while away the days as you wait for next April's excruciating tax season. Get tax forms online that you can view with Adobe's Acrobat—which is available via link—and information on where to file returns and where to get help. You can even meet the tax commissioner
URL=http://www.ustreas.gov/treasury/bureaus/irs/irs.html

53 Glossary of Futures & Options Terms
Why guess? Why make a mistake? Make sure you know exactly what you're talking about. This site translates economese into English, providing an alphabetical list of important terms, clear definitions, and links to related or synonymous terms.
URL: http://www.cme.com/cme/glossary.html

54 Department of Economics, University of Michigan
The University of Michigan houses a collection of comprehensive research on the economics of doing business on the Net—studies of access and pricing schemes, overviews of economic problems facing the Net, and more
URL=http://gopher.econ.lsa.umich.edu

55 Sam Houston State University Economics Gopher
This superb Gopher site points to a variety of sites for information on foreign exchange rates, details on the Federal Communications Commission, George Holt's Stock Market Reports, and Huang's Weekly Futures Market Report. You can also access the U.S. Bureau of Labor Statistics for dozens of documents on U.S. labor information, including price data.
gopher to niord.shsu.edu, select Economics directory

56 Texas A&M University
From investments to lovestia, this well-stocked Gopher hole has extensive international data as well as the Pragati investment newsletter, which is full of data on companies and their stocks. You can also let your fingers do the walking through the Internet Business Pages, a yellow pages for businesses that's free to those who want to be included.
gopher to gopher.tamu.edu, select Browse Information by Subject, then Business

57 Business and Economics from North Carolina State University
This sizable Gopher points to strong resources. Notable are the Technical University Berlin Economics Gopher, a good source for European economic data, and Resources for Economists on the Internet, Goffe, for tips on access to the Vienna Stock Market and search details for economic information.
gopher to dewey.lib.ncsu.edu, select directories Library Without Walls, Study Carrels, Economics and Business

58 GwICluo Web Server
This server from Texas (and New Zealand), and it's full of links to valuable economic data, from courses such as the NASDAQ Financial Executive Journal and the Uniform Commercial Code Gopher Server. You can also hop into the Bank of America's server for wire transfers, electronic payments, and tracking hard-copy checks
URL=http://kiwinlab.bus.utexas.edu/finance/kiwiserver/kiwiserver.html

59 University of California at Berkeley Library
This site is loaded with resources such as the Berkeley Business Guides, which cover everything from market data sources to federal taxation. There's an incredibly useful directory of economists, including their e-mail addresses. Not only can you check out what's new in U.C. Berkeley's library, you can also use a gopher to access arch-rival Stanford University's business school library.
gopher to infolib.lib.berkeley.edu, select Electronic Journals, then Research Databases, then Business

60 DigiCash
What's in store for money in the future? Find out through this site, brought to you by DigiCash, the Dutch company that specializes in smartcards (debit cards), security, and electronic-payment technologies. Learn more about the concept of e-cash, and even download the e-cash software.
URL=http://www.digicash.com/company/digicash.html

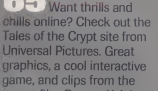
61 J. P. Morgan
Uh, wannabe tycoons, we've got a Web page for you. With access to the J.P. Morgan Commodity Index and a series of investment research index tools, you have the digital data to help simplify commodity investments and address the shortcomings of ending commodity indexes
URL=http://www.jpmorgan.com/

62 Financial Economics Network
A one-stop site if you're looking for information on financial economics. Created by the managing editor of the Journal of Financial Economics, this site offers online abstracts of working papers from around the world and forthcoming articles in major finance and economics journals, plus job listings, a résumé listing service, and industry announcements
URL=http://www.crimson.com/fen/

63 Ernst and Young
It's almost like having your own personal accountant online. Have a question about corporate tax, personal tax, employee tax, or customs and excise? Fill out a form and fire it off, or e-mail directly to Ernst and Young (taxmaint@eyeuty.co.uk). The site also provides interesting articles and surveys, as well as the addresses and contacts for their offices around the world
URL=http://www.worldserver.pipex.com/ernsty/

Where PCC's Editors Hang Out

64 Hot Hot Hot
A Cajun girl at heart, I like my food spicy. If you're like me, and searching for something more potent than Tabasco, you can order from a collection of international hot sauces.
URL=http://www.hot.presence.com/p/p/h3/index.html
Liesl La Grange, Associate Editor



65 The Crypt
Want thrills and chills online? Check out the Tales of the Crypt site from Universal Pictures. Great graphics, a cool interactive game, and clips from the recent film *Demon Knight* make this one spooky site.
URL=http://www.mca.com/universal_pictures/tales/crypt.html
Clementine Oliver, Associate Editor

66 Internet Mall
Hate shopping? Cruise the Internet Mall. I recently test drove Land Rover's new Discovery. Not quite as exciting as the real thing, but I avoided the attack of the car dealer.
URL=http://www.mecklerweb.com/imall/
Adam Meyerson, Technical Director

67 rec.pets.dogs
A great source of information about all types of dogs, and a very popular site. There's a very good chance you will find information regarding your favorite Fido. Highly recommended for new or potential canine owners.
URL=http://io.com/user/[illegible]/dogs-faq/home.html
George Hackman, Usability Labs Manager

Random Access

Searching for a fresh marketing idea? Need a topical joke for your next presentation or sales call? Or do you just want to understand what everybody's chatting about down by the water cooler? Never fear. A few hours spent tooling around the Internet can keep you up-to-date with the world outside of your office.

68 Time Warner
One of the most exciting new sites on the Web, Time Warner features an excellent (if modem-hostile) graphical front end to a number of company offerings. Get up-to-the-minute news, and peruse Warner publications such as Time and Entertainment Weekly.
URL=http://pathfinder.com/

69 Travels with Samantha
One of the winners of the 1994 Best of the Web Awards (as selected by Webfriks like you and me), this fascinating site takes you on a bird's-eye tour of places you've likely never been on North America. Follow Philip Greenspun and Samantha, his Apple PowerBook, on their journey, and learn not only about the many places to visit on this continent, but about the people as well.
URL=http://www-swiz.ai.mit.edu/samantha/travels-with-samantha.html

70 Friends of the Earth
This site resides on a server in the U.K. - but its focus is truly global. If you're interested in environmental issues worldwide, this is the place to be. With a link to Friends of the Earth International, a what's-new page, and environmental campaign details, this site will help you and Mother Earth stay on good terms.
URL=http://www.foe.co.uk/

71 America's Cup
Sailing fans unite! Especially those with expensive tastes. This site features everything you want to know about the America's Cup race: the event's history, a photo album of participants and vessels, a glossary, and an contest poll.
URL=http://www.ac95.org/

72 RockWeb
Originally called RockNet, this site hosts pages for a few bands and provides some interesting links to other music sites. Check out an experimental page for live chatting with other RockWebbers, pages for bands including Blues Traveler, the Spin Doctors, and the Black Crowes, and a downloadable archive of photographs of musicians.
URL=http://www.rock.net/

73 British Broadcasting Corp.
See BBC in all its splendor, complete with schedules of programs, ticket information, and other (rather) lively bits. Learn what might have been had Paul Revere stayed comfortably at home. There are detailed pages on some smashing radio shows, selections of shows currently on the telly, plus Cavendish Diaries and other political news archives.
URL=http://www.bbcnc.org.uk/bbctv/

74 The Sports Server
Coverage of basketball, football, and baseball, with a commitment to featuring college and minor-league professional sports as well. Useful on a day-to-day basis for following each professional team in detail; getting updates on injuries, scores, and standings.
URL=http://www.nando.net/sptsserv.html

75 MPEG Movie Archive
This Dutch site features MPEG movies you can download and play on your PC if you have a player. There's a supermodel collection for those who haven't seen enough of Cindy Crawford, an excellent animation and space clips, and a limited selection of movie and music sound clips.
URL=http://w3.eeb.ele.tue.nl/mpeg/index.html

76 Fox Broadcasting
Fox and the Web are natural partners because so many student contributors are fans of the network's shows. This collection of fan material is often better than the programs themselves. View pictures of Kelly Bundy. Link to three separate Simpsons sites. Or check out Spelling-Land for info on 90210, Melrose Place, and Models, Inc.
URL=http://www.eden.com/users/my-html/fox.html

77 Games Domain
Take a break from the daily grind in these FAQs, FTP locations, and Web sites featuring all kinds of games—board, computer, card, you name it. Play around with a link to an interactive Battleships game, info about role-playing games, as well as newsgroup questions and answers about games.
URL=http://wcc-rs.sbsrm.ac.uk/GamesDomain

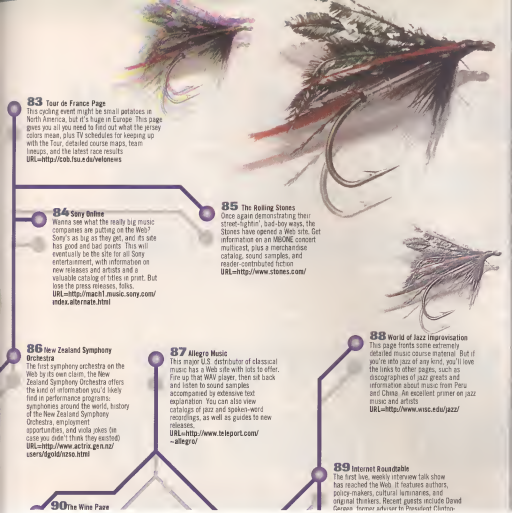
78 Cardiff Movie Database
There are a lot of books and CD-ROMs that provide movie information, but both cost money. The Cardiff University database is phenomenal, with details and reviews of thousands of movies, plus downloadable graphics and sound. You can even vote for your likes and dislikes.
URL=http://www.cm.cf.ac.uk/Movies/

79 Ultimate TV List
For links to anything on the Internet about network TV shows, this is the page to visit. You get FTP and newsgroup archives, plus Web and Gopher sites galore. Tune in for alphabetical listings from the Animaniacs to The Young and the Restless. Frequent updates, with pages added constantly; and listings by category and type of resource.
URL=http://cinenet.net/UTVL/utvl.html/

80 Star Trek Generations
If you're thinking of launching a big-budget movie, check out how Viacom promoted its "Jim meets Jean-Luc" spectacle. (And if you think there's no advertising on the Web, think again.) Travel at warp speed to this graphics-rich site with multiple pictures, behind-the-scenes information, and downloadable graphics, sound, and video files.
URL=http://generations.viacom.com/

81 O.J. Simpson Trial
Nope, you can't just turn off the TV to escape, it's on the Web as well. There are actually several O.J. sites, including a joke page, but this one's more serious. Get official articles from the San Francisco Examiner, interesting interviews about the case, and links to other O.J. sites.
URL=http://sfgate.com/examiner/ojindex.html

82 Condom Country
Ingredients of this site are perhaps best left undescribed. But for the adventurous, it's a superb example of how to design a site for a market niche. Grab your shopping bag and head to the checkout counter, where you can receive product information, get return-policy details, and pick up a form to set up an individual account.
URL=http://www.ag.com:194/Condom/Country/



83 Tour de France Page
This cycling event might be small potatoes in North America, but it's huge in Europe. This page gives you all you need to find out what the jersey colors mean, plus TV schedules for keeping up with the Tour, detailed course maps, team lineups, and the latest race results
URL=http://cob.fsu.edu/velonews

84 Sony Online
Wanna see what the really big music companies are putting on the Web? Sony's as big as they get, and its site has good and bad points. This will eventually be the site for all Sony entertainment, with information on new releases and artists and a valuable catalog of titles in print. But lose the press releases, folks.
URL=http://mach1.music.sony.com/index.alternate.html

85 The Rolling Stones
Once again demonstrating their street-fightin', bad-boy ways, the Stones have opened a Web site. Get information on an MBONE concert multicast, plus a merchandise catalog, sound samples, and reader-contributed fiction
URL=http://www.stones.com/

86 New Zealand Symphony Orchestra
The first symphony orchestra on the Web by its own claim, the New Zealand Symphony Orchestra offers the kind of information you'd likely find in performance programs: symphonies around the world, history of the New Zealand Symphony Orchestra, employment opportunities, and viola jokes (in case you didn't think they existed)
URL=http://www.actrix.gen.nz/users/dgold/nzso.html

87 Allegro Music
This major U.S. distributor of classical music has a Web site with lots to offer. Fire up that WAV player, then sit back and listen to sound samples accompanied by extensive text explanation. You can also view catalogs of jazz and spoken-word recordings, as well as guides to new releases.
URL=http://www.teleport.com/~allegro/

88 World of Jazz Improvisation
This page fronts some extremely detailed music course material. But if you're into jazz of any kind, you'll love the links to other pages, such as discographies of jazz greats and information about music from Peru and China. An excellent primer on jazz music and artists
URL=http://www.wisc.edu/jazz/

89 Internet Roundtable
The first live, weekly interview talk show has reached the Web. It features authors, policy-makers, cultural luminaries, and original thinkers. Recent guests include David Gergen, former adviser to President Clinton;

90 The Wine Page

Where PCC's Editors Hang Out

98 **The *New Republic***
Although it's not particularly graphically rich, The *New Republic*'s Web site offers rather comprehensive excerpts from the current newsstand edition of this ever-sharp and informative publication.
URL=http://www.enews.com:80/magazines/tnr/
Clementine Oliver, Associate Editor

99 **X-Files**
Are you an X-phile? Discuss the many mysteries of the Friday-night phenomenon on alt.tv.x-files. Tune in as the David Duchovny and Gillian Anderson fan clubs keep you up-to-date on the stars' latest happenings.
URL=http://www.uml/edu/~ccashman/x-files/x-files.html
George Hackman, Usability Labs Manager

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Random Access

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68 Time Warner
One of the most exciting new sites on the Web, Time Warner features an excellent (if modem-hostile) graphical front end to a number of company offerings. Get up-to-the-minute news, and peruse Warner publications such as Time and Entertainment Weekly.
URL=http://pathfinder.com/

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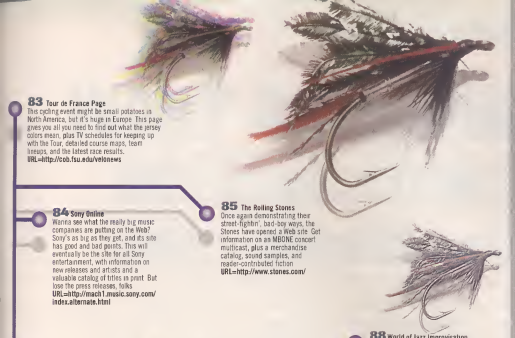

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URL=http://www.IRsociety.com/

90 The Wine Page
Wine lovers will appreciate the University of Washington's World Wide Wine Page. Visit tasting archives to browse hundreds of tasting notes and add some of your own, tour Washington wineries, get answers to FAQs, and even join a Virtual Tasting group. But remember: No virtual driving if you're taking part in the virtual tasting.
URL=http://augustus.csscr.washington.edu/personal/bigstar-mosaic/wine.html

91 The Download Bookstore
Bibliophiles: Like to browse before you buy? The Download Bookstore from Dial-a-Book is a new Web-based bookstore that posts chapters and tables of contents for hundreds of books computer titles, children's books, and works from leading university presses. It uses Adobe Acrobat 2.0, so any platform will do.
URL=http://dab.psi.net/DownloadBookstore/

92 Warner Brothers Records
Still think the Bee Gees really groove? Visit Warner Brothers Records' home page to find out what's hot in the music world. Get a list of REM's 1995 world tour dates, a 30-second Madonna video, bios of Eric Clapton and other Warner artists, and other rock lore.
URL=http://www.iuma.com/Warner/

93 CDnow! The Internet Music Store
Can't stand the hoards of teenyboppers at local music stores? Tune in to CDnow! to order CDs and read music magazines online. Browse through more than 140,000 CDs, cassettes, and minidiscs. Participate in discussion groups with other customers.
URL=http://cdnow.com

94 Interactive Media Festival
You don't need to go to Los Angeles to witness next month's annual Interactive Media Festival (June 5 to 10). See the best of interactive arts and media development via your PC. This year's competition will actually be judged online within the "Jury Chamber" of this Web site.
URL=http://www.arc.org

95 Internet Express
This well-stocked gopher site has everything from entertainment archives to literature and magazine collections to business statistics. Check out the Nielsen Ratings, read excerpts from The New Yorker, or listen to Star Trek sound files to hear Scotty's accent once more.
gopher to cscns.com

96 National Hockey League
The main repository of NHL information comes, naturally, from Hawaii. Complete with pictures of Wayne Gretzky and Mario Lemieux, individual team pages, links to pages around the Web, and details on the 1993-1994 Stanley Cup playoffs. This page offers hours of material.
URL=http://maxwell.uhh.hawaii.edu/hockey/hockey.html

97 The Virtual Flyshop
A superb site for anyone interested in fly-fishing, or anyone who simply wants to see the right way to build a Web site. Reel in fishing videos in the Movie Theatre, plus information on knots, and links to newsgroups and magazine-style articles. There's even a fish scale to compare your prize catches with photos from other braggarts.
URL=http://glenn.uwaterloo.ca/~mcdermid/Virtual_Flyshop/flyshop.html

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URL=http://www.uml/edu/~ccashman/x-files/x-files.html
George Hackman, Usability Labs Manager

100 *PC Computing* Home Page
Visit our Web Edition and you can explore a live, clickable Web map and check out links to hundreds of the most exciting sites.
URL=http://www.pc-computing.ziff.com/~pccomp
Rich Schwerin, Associate Editor

101 AT&T 800 Directory
Don't know the exact company name you're searching for? Enter a partial string and see all the possibilities. Try getting directory assistance to do that!
URL=http://att.net/dir800
Adam Meyerson, Technical Director

Set Your Sites

Admit it: You enjoy reading funny jokes, hearing silly sound files, and seeing goofy pictures on the Internet—it's part of the charm. But when you need to find information right away, the charm of these diversions fades. They're no longer cute—they're a waste of time. Factor in the time you often have to spend roaming through dozens of sites to find the information you're searching for—especially if you have a slow system—and surfing the Internet becomes a time-consuming process, not exactly a day at the beach. To speed up your search, check out the table below to pinpoint the best of the best sites we've listed, grouped by area of interest.

Sites for Your Eyes

	Site Name	Site No.	How to Get There
Computers	Computer and Communications Companies Web Page (Lawrence Livermore National Lab)	17	URL=http://www-atp.llnl.gov/companies.html
	Dan Kegel's ISDN Page	page 176	URL=http://alumni.caltech.edu/~dank/Isdn
	DigiCash	60	URL=http://www.digicash.com/company/digicash.html
	The Internet Tools Summary	33	URL=http://www.rpi.edu/Internet/Guides/decemj/internet-tools.html
	PC Computing's Home Page	100	URL=http://www.pc-computing.ziff.com/~pccomp
Education	AskERIC Virtual Library	15	URL=http://ericir.syr.edu/
	The Jason Project	18	URL=http://seawifs.gsfc.nasa.gov/scripts/JASON.html
	University of California at Berkeley Library	59	gopher to infolib.lib.berkeley.edu, select Electronic Journals, then Research Databases, then Business
Finance	GNN Personal Finance Center	40	URL=http://www.digital.com/gnn/meta/finance/index.html
	QuoteCom	45	URL=http://www.quote.com/
	Sam Houston State University Economics Gopher	55	gopher to niord.shsu.edu, select Economics directory
	SEC EDGAR Database	48	URL=http://town.hall.org/edgar/edgar/html
Management & Administration	M-LINK (University of Michigan)	20	gopher to una.hh.lib.umich.edu:70/11/socsci/econ
	Social Security Administration Online	13	URL=http://www.ssa.gov/SSA_Home.html/
	Small Business Administration	14	URL=http://www.sbaonline.sba.gov
	Total Quality Management Bulletin Board (Clemson University)	31	gopher to deming.eng.clemson.edu, select the Public File directory, then the TQM Bulletin Board directory

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Nerdvana on the Net

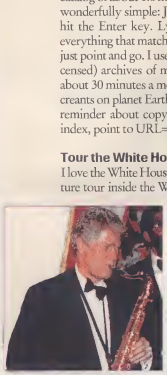
The biggest frustration with the Internet is that there's plenty of great stuff out there but you don't always know where it is. If you're like me, this causes a feeling of paranoia that people are hiding things from you. And if you're not like me, you're a deviant and you should seek professional help.

Carnegie Mellon Lycos

Either way, take a look at Carnegie Mellon's Lycos index of World Wide Web resources. It's an online catalog of about 1.6 million Internet addresses, and it's wonderfully simple: Just type a subject into a box and hit the Enter key. Lycos comes back with a list of everything that matches with a clickable address list—just point and go. I use Lycos to search for illegal (unlicensed) archives of my comic strip, Dilbert. It takes about 30 minutes a month to locate all the digital miscreants on planet Earth and send them a friendly e-mail reminder about copyright laws. To reach the Lycos index, point to URL=http://lycos.cs.cmu.edu.

Tour the White House

I love the White House's Web pages, especially the picture tour inside the White House. I'm not sure why I like it so much—I think it's because I imagine myself as the President, wandering the rooms of the White House late at night in my pajamas with a Polaroid camera, muttering "I can't believe the dolts voted for me," then laughing hysterically and snapping pictures for my post-impeachment scrapbook. This virtual tour gives you a sense of what it would feel like to be in the government. I felt myself growing more corrupt with each new room I visited. By the end of the tour, I was ready to pickpocket a lobbyist. It's a great diversion, but remember, this is the government you're interacting with. So wear old clothes, and take a shower when you're done. Point to URL=http://www.whitehouse.gov.



Dan Kegel's ISDN Page

Did you ever fantasize about fixing a problem, influencing an entire industry, and changing the behavior of thousands of people? Dan Kegel does it in his spare time with his Web page of ISDN resources. ISDN is a standard that lets you send 128Kbps of channelized digital data across regular phone lines. It's been around for years, but lately it's a hot topic for people who want speedy access to the Internet. Trouble is, nobody could find good information on what ISDN is, how to get it, or what it costs. Until now. Kegel is single-handedly solving the ISDN information gap problem, at least for cybercitizens. He has built a Web page of pointers to all sources of ISDN information on the Net. It's the richest source of information on any topic I've seen online. Go to URL=http://alumni.caltech.edu/~dank/isdn/.

Dilbert on America Online

For America Online subscribers, I humbly recommend a visit to the Dilbert area. Download classic (OK, old) Dilbert cartoons and view them on the fly. (And if you don't have a fly, you can view them on your screen.) And—contain your excitement—you can even look at pictures of the author and his cat, Sarah, and read all about them. It's just like an online version of *People* magazine, but without the substance, celebrity appeal, or photo quality. And you can click over to the Dilboard forum and weigh in on the important questions of our time, such as "Can Dogbert beat up Nancy?" The America Online keyword is: Dilbert.

Library of Congress

Check out the Library of Congress's Web page and hop over to the American Memory Project. I was awed by its potential. It's still under construction, but the stuff that's already there is terrific. Check out the Civil War pages to see how interesting history would be if it weren't taught by history teachers. It feels like you're operating a time machine. Read the time line of Civil War events, then click on the link to the event you're interested in to see what it looked like through the lens of famous photographer Mathew B. Brady. It's a different experience than reading a book—more tactile and with a greater sense of discovery. Personally, I like looking at pictures of people with bullet holes and frostbite, and reflecting on the fact that my biggest problem in life is that my inline graphics don't display fast enough. It keeps life in perspective. Find the page at URL=http://lcweb.loc.gov/.

SCOTT ADAMS *creates the popular comic strip Dilbert, which appears in newspapers and books and in the Dilbert Screen Saver from Delrina.*

Anatomy of a Smarter Mouse.

SMARTER CLICKING
Double-click with just one click.

SMARTER BUTTONS
Program any mouse button to perform the following repetitive tasks:
- LOCK BUTTON. *Just click once and you can drag, scroll, or highlight large blocks of text without having to hold the button down.*
- SEND KEYS. *Save time by executing multi-step commands with a single click. You can print a document, enter a block of text, log onto a network, download your e-mail, even send a fax from your fax/modem.*
- SHORTCUTS. *Work faster by automating frequently used Windows commands. You can open and close a file, copy, paste, switch to task list, and a lot more. Just click once to execute any command.*

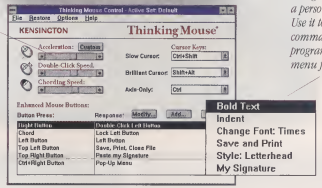
SMARTER CURSOR
Brilliant Cursor® technology saves time and jumps cursor to defined screen HotSpots. Save even more time and have cursor automatically jump to default button.

SMARTER SIDES
Rubberized EasyGrip™ sides for more comfort and control.

SMARTER MENUS
A single button click brings up a personalized pop-up menu. Use it to organize and execute commands within your favorite programs. Create a different menu for each program.

SMARTER ACCELERATION
Change acceleration to match the way you work.

SMARTER WARRANTY
5-year warranty, toll-free technical support, no risk 90-Day Trial.



It has four programmable buttons. More than a dozen time-saving functions. You can even create a personalized pop-up menu for each of your favorite programs. And the hardware is as smart as the software—with rubberized EasyGrip™ sides for more comfort and control. Includes software for Windows, OS/2 and DOS. Available in Serial & PS/2 and Bus versions. 100% Microsoft compatible. For more information, call Kensington at 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, call and request document 325.

Thinking Mouse
4-Button Programmable Mouse

KENSINGTON

Editors' Home Office Computing Pick

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Industrial design and engineering by Taylor & Chu/MOTO Development Group, San Francisco. © 1995 Kensington Microware Limited 1/95

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Crossroads

PowerPC vs. Pentium:

BY MATTHEW LAKE

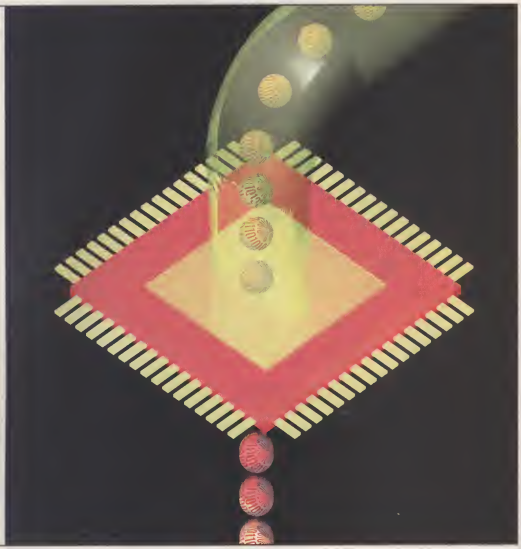
PowerPC: The reduced instruction set computer (RISC) architecture is at the heart of the PowerPC. Using instructions that are all the same length enables the PowerPC to handle computer code efficiently through a process called pipelining.

Pros

- PowerPC handles floating-point calculations and graphically intensive tasks faster than the Pentium.
- It's a logical upgrade for Macintosh users.

Cons

- PowerPC has a much smaller installed base and fewer native applications than the Pentium.
- There is a limited number of system manufacturers.



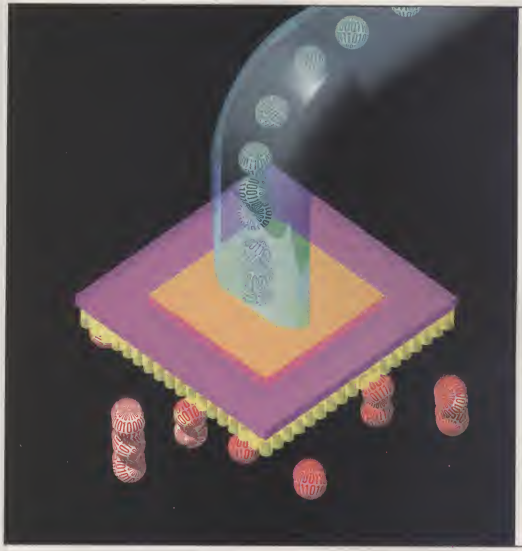
Verdict

Pentium And Its Descendants: You simply can't argue with the widespread acceptance of the Intel x86 processor family. The Pentium and the next-generation Intel CPU, P6, are supported by scads of native software. And x86 chips are installed in ten machines for every one RISC-based machine. (Only a fraction of those RISC machines are PowerPCs.) On floating-point–intensive applications, the PowerPC seems significantly faster than Pentiums. On graphics applications, a PowerPC is faster than a Pentium alone, but a Pentium system will be just as fast when coupled with a video card.

The Buzz

Chipping Away: Arguments about market forces aside, the PowerPC chip has a lot going for it, including low price and high performance. But the only popular operating system it runs is the Macintosh System 7.*x*. Standard Windows won't hack it on the PowerPC, except in emulation—and the additional layer of interpretation between application, operating system, and processor slows everything down. Our survey of industry watchers is split: The PowerPC chip offers true RISC performance, but it will be slow to gain market share.

ILLUSTRATION BY TIMOTHY EDWARD DOWNS



Pentium: By basically gluing two 486s together, Intel speeds up its CPU performance. But the Pentium is still built around an inefficient complex instruction set computer (CISC) architecture.

Pros

- Intel has garnered a huge installed base of Windows and OS/2 users.
- The average cost of a Pentium is dropping rapidly.

Cons

- The Pentium's performance is hampered by less efficient floating-point performance compared to RISC-based chips.
- Its reputation took a severe knock with the news late last year of faulty FPUs.

Timetable

YEAR 98 EXPECTED

No Radical Changes: Trials for systems based on Intel's P6 chip, announced in February, will take place this year. In the interim before P6 systems ship in quantities, dual-Pentium systems with graphics accelerators will proliferate. They will deliver the kind of performance that will keep the PowerPC in the shadows. But as Windows NT and OS/2 are ported to the PowerPC—and as they gain ground over the next three years as the operating systems of choice for desktop machines in general—the RISC-based alternatives will become more attractive.

Opinions

"PowerPC will never take off without a proper OS. AIX is hell, and the PowerPC's Windows emulation is lame. When NT for the PowerPC comes out, the chip will stand a better chance—depending on how it runs 16-bit Windows apps in emulation.

JUHA SAARINEN, INFORMATION TECHNOLOGY CONSULTANT

It's all market force with chip upgrades. Multi-Pentium systems will go on for a while, but RISC will win.

SHIRLEY MALCOLM, OPERATING SYSTEM BETA TESTER

3-D rendering lends itself to RISC. I refuse to invest in CISC chips anymore.

MORGAN FREW, SOFTWARE DEVELOPER

Help: Working Smarter Around the Network in Eight Days

Building and configuring a network shouldn't be a torturous voyage. Maybe just a cross-Atlantic flight. Local area networks promise incredible increases in productivity. They may or may not fulfill that promise, but they do make things easier. First, however, things will get a whole lot harder. You need to decide which architecture and hardware you'll use, and when to roll it out.

First you need to establish whether you want a peer-to-peer network, a server-based network, or both. Each choice has its advantages and, naturally, some drawbacks. The main difference is that with a server-based network, shared resources (printers and disk volumes, primarily) are connected to one computer, called a server. All the other systems on the network (called nodes) use the server's shared resources. With a peer-to-peer network, shared resources can reside on any node, and a node can be both client and server—even at the same time.

Server or Peer? There are three main advantages to a server network. First, you and your users know that the server will be turned on and working at all times (unless it crashes), so you don't have to worry that a needed resource may be located on a computer that's turned off for the weekend. Second, you control the backup: Attach a tape drive to the server, and you can back up all shared files at once. Third, it's easier to manage one server than ten peers.

The main disadvantage of a server network is that you have a central point of failure: If the server goes down, your entire network is down. Also consider that a server network is generally more costly to install, requiring a larger initial investment in both hardware and software.

Peer-to-peer networks basically have the opposite problems and advantages. You don't know if a given node is going to be available at a given time; files are distributed all over the place, so backing up is a chore; and finding a problem in this type of network can take a long time. But your files and applications are probably distributed over several systems, and peer-to-peer networks are generally less expensive to buy and install. Ironically, even on peer networks, one system usually winds up as a designated server—because it just gets too confusing to let everyone keep files anywhere they like.

We recommend that you combine a server network and a peer-to-peer network. For example, you might purchase Novell NetWare to set up a standard server network, then install Microsoft Windows for Workgroups on all the clients so that they can share each others' resources: CD-ROM drives, laser printers, information on hard disks, and so on. An alternative to this method would be to install Windows NT Server 3.5 as your server operating system and use Windows 95 (when it's available) as the client. Such a collaboration is the best of both worlds, and if you already have or are considering a server network, it's not that much more expensive.

Pros and Cons What are the relative advantages of each scheme? Novell NetWare, especially NetWare 3.12, is incredibly popular. That means if you have a problem, the odds are good that you'll be able to find someone in a jiffy who can fix it for you. NetWare 3.12, however, lacks a graphical user interface for the administration tools, so administration can be a bear. Much of the NetWare 4.1 administration is done through a nice user interface, but it's a nice user interface that runs on a NetWare client. All of which means that if for some reason, your clients can't attach to the server, you lose the graphical administration interface.

Windows NT Server 3.5 keeps its graphical interface at all times, so administration is generally somewhat simpler than NetWare's. In addition, if you're interested in dialing in to your server, Windows NT Server 3.5 comes with remote access services, which you must purchase separately for NetWare.

Once you decide which scheme you prefer, you have to buy the appropriate software. The most popular server-based network software is Novell NetWare 3.12, although it seems that Novell is trying to phase out this product and replace it with NetWare 4.1. With either version, you can

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One 66MHz 486 Server (with Tape Backup and CD-ROM Drives)	$12,500
Ten 25-foot Lengths of Cable	$175
Total	$16,225

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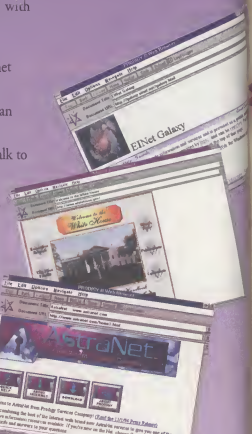

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expect to spend less than $1,500 for a ten-user license. Microsoft's Windows NT Server 3.5 is also turning out to be a good server, and it's a lot less expensive: about $300 for the workstation version—which can also be used as a server, and will support an unlimited number of users.

Artisoft LANtastic 6.0 is the most prevalent of the peer networks, with a five-user license starting at around $300. Microsoft Windows for Workgroups 3.11, which you probably already have installed if you bought a computer in the last 12 months, goes for around $130 per node.

No matter how expensive these prices sound, don't be tempted to violate your license agreement (the technical term for pirating software). If you're caught (and the Software Publishers Association is getting very aggressive), it can mean steep fines and even jail time.

Once you've selected your software, it's time to choose the corresponding hardware. Let's start with network interface cards (NICs). You have to decide if you want 10Mbps Ethernet or 16Mbps Token Ring (don't bother with the older 4Mbps Token Ring). Token Ring offers some advantages over Ethernet: It lets you run more diagnostics, its performance is easier to determine, and it interacts more smoothly with mainframes. But it's significantly more expensive. If you have an IBM mainframe or an AS/400, consider Token Ring. Otherwise, save your money: Ethernet is inexpensive, it's easy to install, and it offers some remarkable performance-boosting advantages, including standards that enable it to run at 100Mbps.

While we're on the subject of making Ethernet faster, there are four basic ways to boost its performance: proper segmentation of your network, investing in what's called a full-duplex hub, purchasing a switching hub, or purchasing a 100Mbps setup. The first way, segmentation, won't actually yield performance above 10Mbps, but it will clear up the congestion on your network, enabling traffic to pass at 10Mbps, rather than 4Mbps or 5Mbps with lots of collisions. Full-duplex Ethernet uses a technique that enables both pairs of wires in your twisted-pair Ethernet cabling to be used at once (normally, they operate one after the other, one set to transmit, one set to receive). Theoretically, this can double performance. In reality, the performance boost is more modest—a maximum of about 50 percent faster. Switching is a clever way to boost throughput by reducing collisions: The hub figures out where each packet is supposed to go and routes it there directly. You can get a 20 to 50 percent performance boost from switching. The 100Mbps Ethernet option is the most expensive solution, with cards that cost from three to ten times as much as typical Ethernet cards. Reserve this solution for your servers and most demanding clients for now, as card prices will be dropping in the next 12 months.

Cable Ready Next, you need to select the cable, Ethernet cards, and a hub. You can normally choose between coaxial and twisted-pair cables, but our advice is not to bother with coaxial cable: It's harder to install, more expensive than unshielded twisted-pair cable, and offers no advantages. Your cable should be rated at Level 3 if your network will never run over 20Mbps, and Level 5 if you have plans for 100Mbps Ethernet. Level 5 cable is better shielded and more resistant to the electrical interference that occurs at higher speeds.

Should you roll your own cable or buy precut lengths? The precut lengths are more expensive but can save you enough

EXPERT TIPS CAREFUL PREPARATION IS THE KEY

Don't Expect Miracles: Pessimism and underpromising are key when installing a network. Prepare yourself, and everyone else, for the project to fail the first time.

1. **Shop around.** This may sound obvious, but just because Joe's Cheap Software had the best deal on NetWare doesn't mean it'll have the best deal on hubs. For each component you buy, call three suppliers, then choose the best price.
2. **Assembly required.** Before you set a date to install your network, take a day in a quiet conference room to lay out all your components. Do you have enough cables and network cards? Do you know how to make a cable? Are all the components compatible with each other?
3. **Server service.** Next, take another day—a whole day—to install NetWare on your server. The installation program is fairly straightforward, but figuring out how to partition disks and making sure you have all the necessary drivers will take at least this long.
4. **Test case.** Take a spare computer, install a network interface card (NIC) and the client software, attach all the cables, and see if you can log in to the server. If you can't, break out the NetWare troubleshooting manual (which comes on CD-ROM).
5. **Set a date.** Assume you can set up two clients a day, and schedule time with each person so he or she will know when you'll be kicking them off their system. Arrange a way to back up their systems if possible. Should the installation fail, revert to the backup files, get them working again, and schedule another time to try the installation. Stick to your schedule, and go on to the next client.
6. **Network lessons.** After everything is installed, spend a couple of hours showing a group of people how to use the network. There's no sense having a file server if users don't know how to log in to it.

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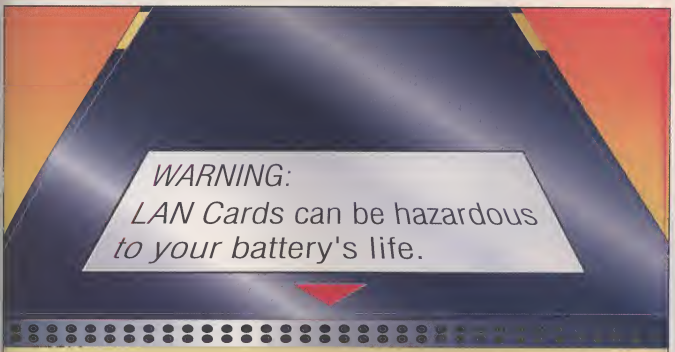
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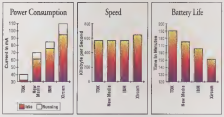

Test Conditions. Server: AST Advantage Expo60 (Pentium 60 Mhz) and Intel EtherExpress 16 Netware 3.12 *Client:* H-P OmniBook 530 (486SX 33 Mhz) with Power Management OFF Netware VLM ver. 1.10

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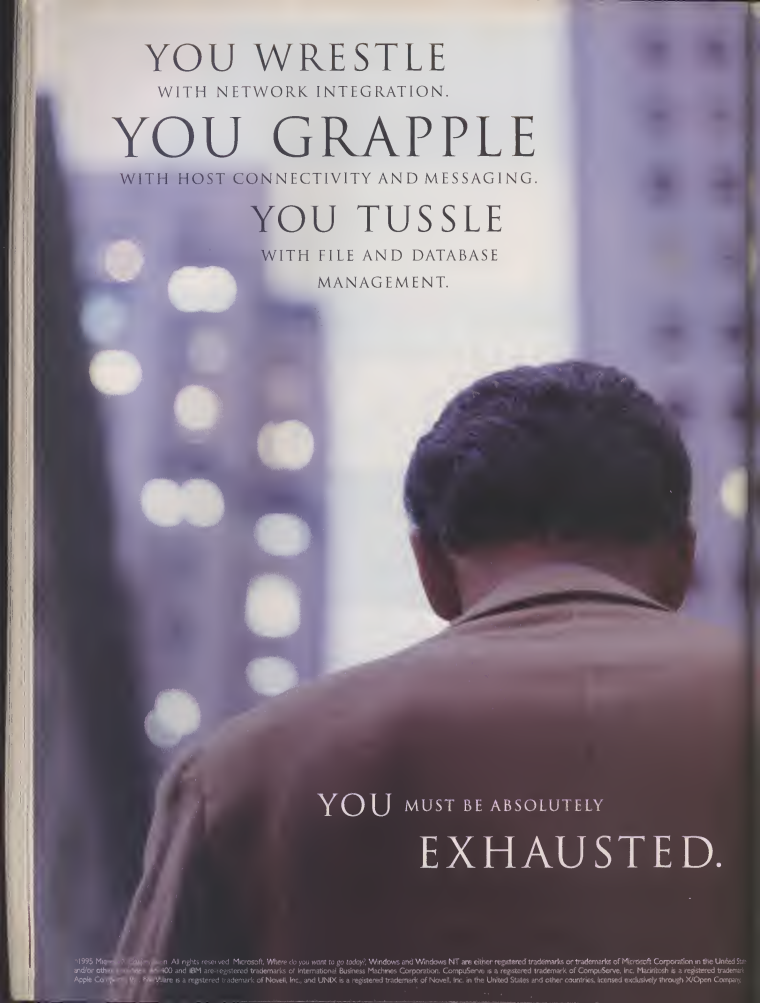
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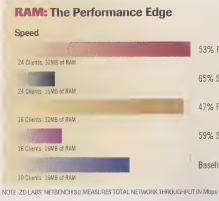

Memory Boost: Not surprisingly, a fast CPU is not enough to speed things up. When you're putting your server together, don't forget extra RAM. By increasing the installed RAM, you'll get noticeably improved performance.

time and aggravation to be worth it. However, if you plan to wire an entire office and will require cable lengths over 100 feet, buy a roll of wire and make your own cables. Otherwise, order precut ones.

Ethernet cards are the next item to purchase. You can spend anywhere from $75 to $200 for a single ISA card. The cards in this range are pretty much the same. Sure, you may get slightly better performance out of one card than another, but you may not even notice the difference. The 3Com EtherLink III 3C509 and Intel EtherExpress 16 10Base-T both have good track records. Figure how many cards you need—one per client—then place a bulk order. You should be able to get a substantial discount by ordering many cards at once. For example, a major direct vendor sells a single EtherExpress from Intel for $99, but offers a 20-pack for $1,698, or about $85 each.

Hub Hubba Next, you need a hub. There are many different types of hubs, but the easiest way to classify them is stackable versus rack-mounted. Stackable hubs are stand-alone boxes, generally about 18 to 24 inches wide, 10 inches deep, and 2 inches tall. They house anywhere from 12 to 80 ports and have expansion cables for connecting several ports. Rack-mounted hubs generally offer more ports, but for a higher price. Stackable hubs are so inexpensive and so easy to deal with that, for up to 100 nodes, it's hard to justify a rack-mounted hub.

What should you look for in a hub? First, consider ports. You want one port per client, plus extras for network printers, servers, and any new clients you might add. Expect to pay $25 to $150 per port. Next, look for manageability: You want visible LEDs on the front panel, and you want the hub to work with whichever network management system you use (such as Hewlett-Packard's OpenView SNMP console). We've seen some good hubs, but our favorite is Asante Technologies' Asantehub 1012, which has 12 ports and sells for around $1,300.

For better performance, you can try a switching hub, or a hub that supports full-duplex Ethernet. Switching improves performance by directing network traffic to its destination more efficiently. Full-duplex increases efficiency by using all four wires in your Ethernet cable at once. Switching hubs are available from Kalpana, Network Peripherals, and NetWorth. Kalpana's hub also supports full-duplex Ethernet. The main drawback to both switching and full-duplex hubs is their high price: five or even ten times what you'd pay, per port, for a stackable hub.

Finally, assuming that you've decided on a server-based network, you need to choose a server. It's generally not enough just to buy a high-end desktop PC and beef it up. You can do that—and even get good performance—but it's an exercise best left to someone who's done it many times. When configuring a server from scratch, you first must decide how much RAM you need. Here's a simple guideline: In a file server, RAM matters more than CPU speed. A 66MHz 486 provides all the horsepower you need for a 50-user file server. Invest what you save on the CPU in more RAM. File servers are I/O intensive, so generally they require fast disks and Ethernet cards. If you have an application server—say you plan to run Oracle's NetWare Loadable Module (NLM)—you need both CPU horsepower and adequate RAM.

Servers are more expensive than regular desktop systems. A typical file-server configuration for 25 users would be an EISA 66MHz 486 with 32MB of RAM, 2GB of disk space, and an EISA-bus Ethernet card. You'll also want a tape drive (for backups) and a CD-ROM drive (for installing software). Both Compaq and Hewlett-Packard offer great servers for around $12,000 to $15,000. Why so much? Because, in addition to the configuration just described, you get error-checking and -correcting RAM, hot-swappable hard disks, and 512K of secondary cache. Oh, and don't forget to buy an uninterruptible power supply to go with your server.

Once you have all the parts, follow this simple plan of attack: Bring the server online with just one client—a client you can afford to do without for awhile. Make sure everything works. Then bring the remaining clients online, one at a time, making sure each works before you proceed to the next. Don't expect to get your network up in a day. Probably not even in a week. And don't promise miracles—they won't happen. Promise disaster, and everyone will be happy when the thing actually works. JOHN MONTGOMERY

FYI YOU GOT IT? USE IT!

Many systems today come with Windows for Workgroups 3.11 preloaded. To set up your systems on a peer-to-peer network, follow these steps:

1. **Install cards.** You need to install an Ethernet card in each PC. If you're dealing with only four or five nodes, you can use thin Ethernet (10Base2) cable.
2. **Configure software.** Have your original Windows for Workgroups 3.11 disks ready. Select the Network Setup application (in the Network group) to turn networking on. The software even includes drivers for all the major Ethernet cards. Reboot, and you're finished.

HP Colorado T1000

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Circle 184 on reader service card.

MAKE LOTUS APPROACH EVEN MORE USABLE

Zen and the Art of Database Management

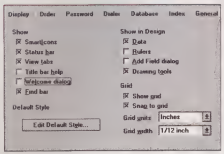
Keep Track I know a guy who started a business in his garage. Sound familiar? He makes tofu burgers, but what once started as a friendly gesture for his neighborhood pals now keeps him very busy—and living in style. It sounds simple, but you'd be amazed at the number of ingredients he orders from all around the world—and wowed by the thousands of customers he has all over the map. When the old-fashioned Rolodex didn't cut it anymore, he needed a new approach. That's exactly what he got—Lotus Approach.

Database for All It just goes to prove that databases aren't just for programmers anymore. Sure, there was a time when the techie down the hall would have to set up a database for the temps who entered information—but it doesn't have to be that way. In just a few minutes, anyone can configure a database to keep tabs on anything imaginable—from the names and phone numbers of their daily contacts to the number of widgets in their warehouse.

Works for You And in a world of complexity, databases are on the fast track to simplicity. Approach is leading the way, so if you haven't already delved into the deeper levels of this easy-to-use program, you probably don't know how much you can make it work for you. Take a few minutes to write some macros of your own. Customize, and then treat yourself to a tofu burger. You earned it.

KYLA K. CARLSON

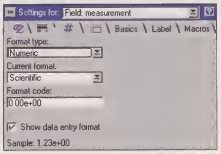
GUIDED TOUR SIX STEPS TO A BRAND NEW INTERFACE



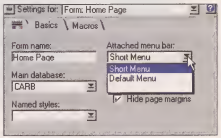
Preferential Treatment: Customize your options in one dialog box: Tools, Preferences. Click on any tab and choose away. The Display tab includes options for interface preferences, such as showing status bars while working, and displaying the Welcome dialog box upon startup.

Make Me a Macro: Put macros in your database to automate simple tasks. From the Design view, draw a macro button. Click on Define Macro, New. Give your macro a name, and assign a command. When you're finished, click on OK, then Done, and then assign that macro to your new button.

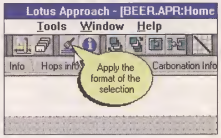
Sensible Sorts: When you need to sort your database, get the information just the way you need it. From the Browse view, click on Browse, Sort, then Define. Select your sort categories and add them to the list on the right.



Look and Feel: Tailor your database from the Design view. Just double-click on any area, and up pops a context-sensitive dialog box. Customize attributes or numerical formats.



Keep It Short: Don't want your data-entry folks to access all of Approach's commands? Show only the short menu list. From the Design view, double-click in the background of your database. Then, from the Basics tab, under Attached menu bar, select Short Menu.



Simple Formatting: The Fast Format option copies formatting from one text block to another. Highlight the desired formatting, and click on the Fast Format (paintbrush) icon. Everything you click on assumes the new formatting.

[ ]

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intel inside

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[!]

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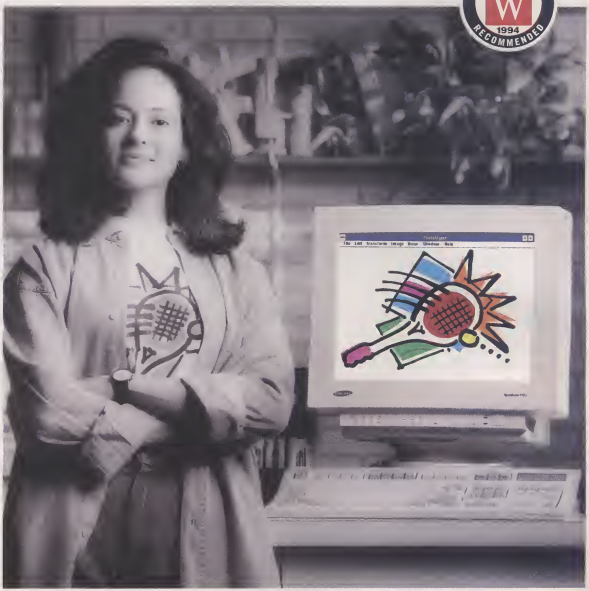
Samsung
A new point of view.

WINDOWS MAGAZINE 1994 RECOMMENDED



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WIZARDS AND EXPERTS AND GENIES, OH MY!

Expert Assistance at Your Command

Imagine having a software genie at your disposal, granting you an unlimited number of wishes. What would you ask for? Whether you're a pro looking for a major time-saver or a relative novice desperately searching for a way to just start the darned job, you'd ask for the world: Do it all for me. And why not? Good software is supposed to automate, reduce time spent with redundant tasks, and cut down your headaches. Until recently, software usually fell short of its promise, acting as a tool but not as the actual worker. Help screens and manuals have their benefits, but even at their best, they don't do the actual work for you. And no matter how organized the information is, you spend time and energy looking for just the right answer to your problem. So a new breed of online help offers support that users have been begging for. Some call these Wizards, others call them Experts, Tutors, Coaches, Assistants, or Genies. What all these smart software agents have in common is one thing: They are interactive help environments, asking you what you want to achieve, and then doing it for you.

The success of the first wave of these agents, namely the Wizards in Microsoft Publisher 1.0, sent a clear message to software publishers that this was a great tool for entry-level users. But more and more today, you'll find Wizards in applications geared toward power users. A good example is Microsoft's Visual FoxPro 3.0, a bona fide, sophisticated development environment. There are 18 Wizards in Visual FoxPro, which is a promising trend in the usability arena for all products.

Buried Treasures The problem is, far too few users are aware of the agents in their favorite applications and they end up underutilizing the programs because certain features seem intimidating. One example is the PivotTable feature in Microsoft Excel 5.0. To many users, it's a puzzling tool. They've read about it in numerous magazine articles, but it's just too abstract. So they never use it. But using PivotTables is as easy as selecting the data you want to analyze, then selecting Data, PivotTable from the menus. The appropriate Wizard pops up and walks you through the process, with plenty of suggestions, examples, and tips illustrating how to analyze your data from different angles (see "Table Manners," page 198). It's that easy. But it's not readily apparent with a superficial glance at the interface.

All Together Now To increase the visibility of these agents, Microsoft (and other software publishers) should consolidate them all under the same icon or menu. Microsoft already does this in Publisher, in two places: at the startup menu, where the Page Wizard offers to design and lay out any type of document you may desire; and under the Page Wizard icon in the toolbar, where additional design Wizards reside. Click on this icon and Publisher presents a cascading menu of options including Ad, Calendar, Coupon, Fancy First Letter, Logo Creator Plus, and Newsletter Banner. Select one of these and start to draw a box or type text, and Publisher pops up appropriate and relevant interactive Wizards.

Microsoft's PowerPoint, which incorporates Wizards that resemble the Wizards found in other Microsoft Office modules, also emphasizes its Wizards at startup—as does Publisher. You can choose a fast AutoContent Wizard or a Pick a Look Wizard—either of which literally creates presentations for you in minutes, based on your input. Even if you bypass the Wizards at startup, you can always select Format, Pick a Look Wizard to set you on course again.

The Microsoft Works Wizards go one step further into helpful hand-holding by offering a handy mix of lists and text-based descriptions with its Wizards. When you select Use a Works Wizard on startup, the screen displays 12 different WorksWizards that help with creation of address books, form letters, databases, business inventory construction, and other daily necessities. Double-click on one of these and the software walks you through the creation of fields, merge templates, or whatever elements your selected task requires.

Novell calls its agents Experts and Coaches, and there are quite a few of these

TOOLS OF THE TRADE USERS' LITTLE HELPERS

To get the most out of your software, learn to rely on agents for help. Unfortunately, every software publisher calls them something different. Here's a sampling of the major players and their agents' code names:

Company	Application	Agent Name
Microsoft	Excel, Office, Publisher, Visual FoxPro, Word	Wizards
Novell	GroupWise, Perfect Office, Quattro Pro, WordPerfect	Experts and Coaches
Lotus	Ami Pro, Approach, Lotus 1-2-3 for Windows, SmartSuite,	Assistants
Borland	dBASE for Windows	Experts
Alpha Software	Alpha 5	Genies

Conceptual design by Robert P. Bunnemak and Jerry D. Flynn of McDonnell Douglas Space Systems

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Circle 136 on reader service card.

throughout PerfectOffice. In Quattro Pro 6.0, there are a few context-sensitive Experts, but there's also a central repository (see "A Regular Summit," at right). While many Experts address more sophisticated features (where help is badly needed), you should try the Budget Expert, which helps users with one of the most basic tasks they use spreadsheets for: home and business budgets. So you don't have to fear "what if" analyses or bullet charts any longer.

Microsoft Word 6.0 for Windows also includes some inconsistent agent features. The Table Wizard in Word provides great help when creating complex tables, but it's practically hidden in the dialog box you get when you select Table, Insert Table (see "A Bashful Wizard," at right). Most users, when faced with this dialog box, just enter the number of columns and rows and continue to tweak the table design manually. But the Wizard provides numerous screens that save you the hassle of starting from scratch, and also illustrates popular table formats—in case you don't know what a table can look like.

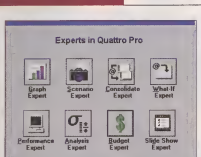
First, it depicts six common table formats. Select one of these formats and press Next, and you get dialog boxes soliciting information about your desired column headings, row headings, text or numeric contents, and portrait or landscape orientation. It's much easier than employing random trial and error or after-the-fact, ad hoc tweaking. And talk about inconsistency—nothing begs for a Wizard more than the Merge function. When you select Tools, Mail Merge, you get a dialog box that doesn't look like a Wizard. In fact, it has a strange look of its own among the Word interactive screens.

More sophisticated users may even attempt to tackle writing their own agents. Some applications make it easy to do so: The Wizards in Word 6.0 for Windows, for example, are written in WordBasic. That means that anybody with a bit of programming savvy can write Wizards tailored to a company or organization. So a law office could design a Wizard for creating boilerplate documents (including wills, contracts, and so on) and then merge them with data from another document.

Design Assistant Agents are great usability features, and hopefully the next wave of software will implement them better (and more often). One sign that this may well be the case comes from the Wizard leader, Microsoft. Windows 95 (whenever it ships) is expected to have several Wizards designed to aid in installation and configuration. In the meantime, learn to rely on agents to boost your productivity. When in doubt, check your user manual or online help for information on all the available interactive helpers. So you'll know what to look for, refer to "Users' Little Helpers," page 196, for a list of several vendors' names for these agents.

JAMES CURY & YAEL LI-RON

SNAPSHOT CLICK HERE FOR EXPERT ADVICE



A Regular Summit: All the Experts you need are gathered here, in the Experts in Quattro Pro dialog box. No need to go hunting for them under different menus and inside various dialog boxes.

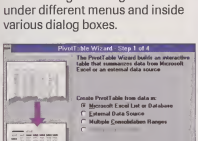
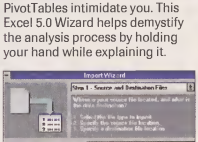
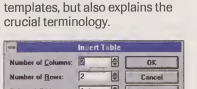


Table Manners: Don't let PivotTables intimidate you. This Excel 5.0 Wizard helps demystify the analysis process by holding your hand while explaining it.

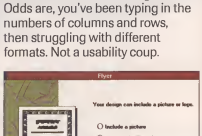


High-end Help: Visual FoxPro 3.0 helps dispel the myth that Wizards are for entry-level users only.

For Business or Home: The Budget Expert in Quattro Pro 6.0 not only creates several budget templates, but also explains the crucial terminology.



A Bashful Wizard: How many tables have you created in Word? Dozens? Have you ever noticed the Wizard button in this dialog box? Odds are, you've been typing in the numbers of columns and rows, then struggling with different formats. Not a usability coup.



Publishing How-tos: Publisher deserves credit for bringing Wizards into the mainstream. Before Publisher, DTP was mainly for professionals , but the Wizards in this program have made it easy to produce beautiful, professional-looking flyers, newsletters, catalogs, and other documents.

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SmartPad: Toolbars at Your Fingertips

There we stood, *PC Computing*'s Daffy Duo, trying not to attract too much attention. It's hard cruising a trade show incognito when you're wearing Day-Glo red badges emblazoned with that magic word, "Press." Everybody wants to be your buddy. Never mind that Woody is wearing an old "Mom" T-shirt bearing encrusted remnants of a rushed breakfast—he doesn't even own a proper suit, dontcha know. Vince glides by in a trance, jet-lagging so badly his knees intermittently brush the ground. Knuckles, too.

Nope. There's a reason for the madness. We had *your* best interests at heart, o exalted reader! Around here, our readers rate Number One, and if that means dragging our tattered carcasses halfway around the country, eating slop that glows in the dark, and sleeping in places destined for *Lifestyles of the Wired and Painless*, well, so be it. It's a tough job but we're so glad that we have an excuse to do it.

And so it was that we found ourselves in front of a booth for a company called Softblox. One of their techno-geeks was taking a Softblox product through its paces. Vince remembers the geek as a tall, thin guy with a resonant voice, wearing blue jeans. Woody swears it was a voluptuous blonde in blue chiffon and stiletto heels; but it had been a very long day. The product, SmartPad, lets you build toolbars for any application—even DOS applications—running under Windows.

The folks at Softblox don't call 'em "Toolbars," of course—"Toolbar" being a registered trademark from Microsoft. Softblox gussies 'em up a bit and calls 'em "Pads." Fair enough.

SmartPad started out looking a lot like Express Systems' Power Launcher—a toolbaresque program launcher. Then he pulled up a SmartPad for File Manager. It was moderately cool, but so far we hadn't seen anything that outgunned our old favorite, Mijenix's WizManager Pro. So he shifted over to a SmartPad for Windows Write, which looked more exciting than a program we've used for a long time, David Stewart's Power Bar/Write.

Things were getting serious. SmartPad obviously offers a lot of flexibility. So we did what we always do when the going gets tough: We swept the geek aside, Woody put on his shades, and Vince took over the keyboard with gusto. By the time the dust had settled—and the sparks flying from Vince's fingers had sizzled away on the carpet—we were quite thoroughly impressed. This is one baaaaaaad programming tool. It offers some pretty fancy Windows application programming capabilities, including Dynamic Data Exchange (DDE), application launching, and SendKeys. It even has its own Basic-like internal programming language—called SmartScript—with lots of powerful capabilities, including dynamic dialog boxes, and full support for DOS applications running under Windows.

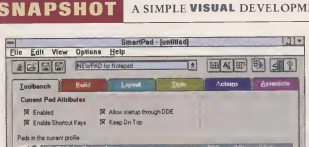
So we're going to show you how to build a simple SmartPad—for Windows' lowly Notepad—knowing full well that you probably don't have a copy of SmartPad. Yet. You'll see what you're missing. Even if you never buy SmartPad, we think you'll get a kick out of seeing how a toolbar-centric universal Windows macro programming language might work. The folks at Softblox call it a "glutility"—and *they* trademarked *that* term. (Bill, are you watching? Neat stuff!)

Talkin' SmartPad Turkey It's all very simple, actually. Pads have buttons, just like toolbars: Click on a button and something happens. Pads can also have tabs, like the tabs on file cards, so you can group buttons—for example, one set for file actions, another set for formatting, and a third for embedding pictures—then easily flip between the collections of buttons.

If buttons merely mimicked the actions of the menus, SmartPad would simply be a pretty face. But in fact, buttons command quite a repertoire: They can run any program (including a SmartScript macro program); send any combination of keystrokes to the current application; click on any menu item; use DDE to control any sufficiently sentient Windows application; or establish links to other pads. In short, SmartPad buttons can do anything a Windows application can do, and then some—providing some industrial strength glue for tying applications together.

There are three different kinds of pads. The Desktop pad, the granddaddy of all pads, runs on your Windows desktop—it's active all the time. The other two types, Associated and Default pads, come into play when you crank up a program. If you start Excel, for example, SmartPad looks around for all pads you've associated with Excel, and hooks them into Excel as soon as Excel has

SNAPSHOT A SIMPLE **VISUAL** DEVELOPMENT TOOL



Where It All Begins: The SmartPad Command Central. We've created one pad by simply clicking and dragging.

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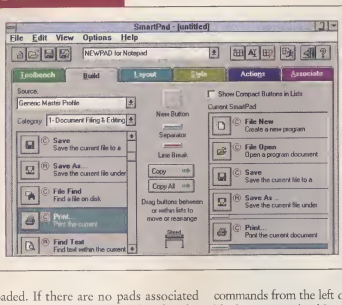


Your Pad or Mine? The Build file card is where you put buttons on the toolbar. By dragging and dropping, we've attached some icons to the NEWPAD for Notepad toolbar: File New, File Open, Save, Save As, a blank spot (called a separator), then Print, and another separator.

loaded. If there are no pads associated with Excel, SmartPad reaches for the Default pad and gets it going.

A collection of pads is called a Profile, and is stored in a file with a KPP extension. Only one KPP file—that is, only one Profile—can be active at a time.

So much for the weird terminology. It's all downhill from here. We're going to build a pad associated with Windows' very own Notepad, thereby jolting Notepad with some high-power macrobiotic brain food, and making that old dog jump through some fancy new hoops. (Besides, we couldn't resist the temptation to make a new Notepad pad named NEWPAD. Say *that* ten times real fast.) You can download the pad (NEWPAD.ZIP) from data library 0 (Windows Utilities) of PC Contact (see page 298 for downloading information). But be forewarned that you must have SmartPad installed for it to work.

Building the Pad Once you've installed SmartPad and sent in the registration card you'll be ready to build NEWPAD. (Warning: The fax number listed on your registration card is wrong—it should be 404-892-0981.) Get SmartPad going by double-clicking on the SmartPad - No profile icon. Click on Start from Scratch and click on OK. Click on the lower-left button that says New Pad, and type in a good name—like, oh, NEWPAD for Notepad. Click on OK (see "A Simple Visual Development Tool," page 200).

Next, click on the Build file-card tab. This is where you build the pad. Drag commands from the left over to the right. Try it once or twice: it's amazingly simple. We built a pad with the following commands (you can do what you like, natch): File New, File Open, Save, Save As, and a separator; Print, and a separator; Cut, Copy, Paste, Undo, and a separator; Find, a blank New Button (drag from the top—it'll become Find Next), and a separator; another blank New Button (it'll later become Insert Time and Date), and a separator; and finally Exit Program (see "Build the Pad from an Icon Library," above).

We need to paste pictures onto the two blank buttons. Click on the Layout file-card tab. Click on the next-to-the last button, the one that's supposed to become Insert Time and Date. Then click on the icon between the camera and the paintbrush, the one that looks like a bookshelf. Scroll through the offered collection of icons and pick one that you like. We chose one that looks like the Windows Control Panel's Date and Time icon.

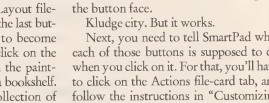
Next, click on the only other blank button, the one that's supposed to become Find Next. Seeing as how Find is represented by a pair of binoculars, we decided to use two pairs of binoculars—one on top of the other—for Find Next. SmartPad's icon editing tools are, ahem, rudimentary, but for our purposes they'll suffice. Here's how to draw the double-binoculars: Click on the camera icon, and take a snapshot of the single binoculars. Then click on the paintbrush. You'll find yourself transported into (ugh!) Windows Paintbrush, with the single binoculars pasted in the upper-left corner of Paintbrush's canvas. Click on Paintbrush's Cut icon—the one that looks like a pair of scissors—and cut closely around the binoculars. Click on Edit, Copy, then Edit, Paste. Click on and drag the second pair of binoculars around so they're below and to the right of the first pair. Zoom in, if need be, to do some touch-up. Next, arrange Paintbrush and SmartPad so that you can see both. Go back into SmartPad, click on the camera again, and take a snapshot of the double-binoculars image in Paintbrush. The double-binoculars will end up on the button face.

Kludge city. But it works.

Next, you need to tell SmartPad what each of those buttons is supposed to do when you click on it. For that, you'll have to click on the Actions file-card tab, and follow the instructions in "Customizing the SmartPad Buttons," page 204.

Finally, it's time to associate this pad

SNAPSHOT THIS IS **NOTEPAD**, TOOLBAR AND ALL



Beefed-up App: Right-clicking on any button brings up a "Balloon Help." In this example, when you right-click on the Paste button the balloon explains what Paste will do.

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EXPERT TIP CUSTOMIZING THE SMARTPAD BUTTONS

Action Figures: On our NEWPAD for Notepad toolbar, all but two buttons (Find and Find Next) correspond to Notepad menu items. So, clicking on the first button mimics selecting File, New. The second button acts as File, Open. You must "teach" SmartPad which menu items correspond to which buttons. To do so, click on SmartPad's Actions file-card tab, then start Notepad. Back in SmartPad, click on the first button in your pad—the File New button—and make sure the Menu Command check box is checked. Next, click on Drop Back. Click anywhere in Notepad. SmartPad pops up a window that says, "Menu Selection for Notepad." Click on File, New.

Unfortunately, SmartPad isn't smart enough to activate grayed-out menu items, so you may have to set up Notepad to activate those items before clicking on the Drop Back button. To teach SmartPad how to do an Edit, Cut, type some text into Notepad, and select that text. Click on the Drop Back button, then on Edit, Cut. The table below shows the Actions file-card settings for the NEWPAD buttons that are associated with menu commands.

Button	Balloon Help	Command/ Keystrokes
File New	Create a new file.	File, New
File Open	Open an existing file.	File, Open
Save	Save current file.	File, Save
Save As	Save file under new name.	File, Save As
Print	Print the current document.	File, Print
Cut	Cut text to clipboard.	Edit, Cut
Copy	Copy text to clipboard.	Edit, Copy
Paste	Paste text from clipboard.	Edit, Paste
Undo	Undo last edit.	Edit, Undo
Insert Time/ Date	Insert the current time and date.	Edit, Time/Date
Find	Find text, replace search text with highlighted text.	Ctrl-C, Alt-S, F, Ctrl-V
Find Next	Find next occurrence of text from previous Find.	F3

with Notepad. Click on the Associate file-card tab. In the upper-left box, under Type, click on Associate with Specific Program. The easiest way to associate this pad with Notepad is to crank up Notepad and minimize it; then, back in SmartPad, click on Drop Back, and click once on Notepad.

Run, Run, Run Save everything by clicking on File, Save, give the Profile the name NEWPAD.KPP, and you're ready to run. There's a button that looks like a light switch next to the Minimize button. Click on that button to test-drive the pad. When you're finished, double-click on the SmartPad icon on your desktop.

After playing with NEWPAD a bit, we got rid of the pad's title bar—it didn't really do anything helpful. Deleting the title bar is easy as could be: Just click on the Styles file card, and check off the check box that says Title Bar. The resulting super-charged new NEWPAD pad for Notepad is shown in "This Is Notepad, Toolbar and All" page 202.

We've hardly scratched the surface of what SmartPad can do. The application interconnection capabilities through DDE alone boggle the mind. And we intentionally avoided the entire SmartScript macro language—it would take another column just to explain the basics, and that module requires the more expensive SmartPad Developer Edition. (However, if you shop around a bit, you can probably beat the list price considerably.)

With so much cool stuff, you'd think Softblox would've covered all the bases, but there's still much left to be desired. The icon library isn't nearly as extensive as it should be: A customizable button bar should ship with lots and lots of button pictures! Try to create a new icon, and you're dumped back into Windows Paintbrush exile—we figure it's easier painting icons with a 25-cent watercolor kit. And the worst part is, there's no SmartScript support as yet for OLE Automation—either as client or server.

The other big problem is SmartPad's runtime. What's a runtime? Good question. It's the part of SmartPad that a user would need in order to be able to get at *any* pad. Say you've created a to-die-for toolbar . . . er, pad . . . for CorelDraw. Every single CorelDraw user in the world would save enormous amounts of time if they would only use this pad. Great. You figure you could sell the pad for, oh, 50 bucks, and the world would beat a path to your door. Unfortunately, to run your pad, every CorelDraw owner would have to buy all of SmartPad (pretty steep for one pad!)—or you would have to finagle a license to distribute SmartPad's runtime with your pad. It's available, but it ain't cheap.

Those are significant drawbacks, but for most corporate developers, they aren't showstoppers. By and large, SmartPad is one killer application. It's definitely worth checking out.

WOODY LEONHARD & VINCENT CHEN

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OUR TECHNICAL STAFF RESPONDS

Questions, Answers, and Tips

Trying to Excel at the office, but missing the macro might? Diphthong got your tongue? Or is it that your font of knowledge doesn't extend to font knowledge? Do silent keystrokes get on your nerves? We address these and other issues about DOS, Windows, and hardware, and we share tips and tricks you can use in your favorite applications.

YANKING STUFF FROM EXCEL

Question: *I have a Microsoft Excel 5.0 workbook that includes a Parts sheet as well as an Invoice sheet. The Parts sheet includes entries like this:*

Item	Cost/Unit	Quantity	Total
Widgets	$3.00	2	$6.00

I want a macro that will go to the Parts sheet, wait for me to enter a line number, copy the data from the line shown above, paste it into the Invoice sheet, and end.

THOMAS FOCONE
PLAINVIEW, NEW YORK

Answer: Let's assume you have a Parts worksheet and an Invoice worksheet.

In this example, the parts list on the Parts worksheet starts in cell A1. Insert a Visual Basic for Applications (VBA) Module into your workbook (select Insert, Macro, Module), then enter the following VBA code:

```
Sub GetPartInfo()
Worksheets("Parts").Activate
Range("A1").Select
Application.OnKey "{Enter}", ↲
↳ "ReturnToInvoice"
Application.OnKey "~", ↲
↳ "ReturnToInvoice"
End Sub
Sub ReturnToInvoice()
Application.OnKey "{Enter}"
Application.OnKey "~"
Range(ActiveCell, ActiveCell.Offset↲
↳ (0, 3)).Copy
Worksheets("Invoice").Activate
ActiveSheet.Paste
ActiveCell.Offset(0, 2).Select
End Sub
```

This is actually two macro subroutines. The GetPartInfo macro is executed from the Invoice worksheet. To make it easy to execute the macro, select the Tools, Macro menu, select GetPartInfo from the macro list, and click on the Options button. Assign a shortcut key such as Ctrl-P, close the Macro Options dialog box, and then close the Macros dialog box. You can press Ctrl-P to execute GetPartInfo. This macro activates the Parts worksheet and selects cell A1. Then it assigns the ReturnToInvoice macro to the Enter key. So you can scroll through the parts list and when the cell pointer is on the desired part, press Enter to execute the ReturnToInvoice macro.

The ReturnToInvoice macro starts by unassigning the macro previously assigned to the Enter key. It then copies the active cell, plus the three cells to the right, from the Parts worksheet. Next, it activates the Invoice worksheet, pastes the Clipboard contents at the active cell position, and selects the cell two columns to the right—which is the cell in which you enter the quantity. If you have more invoice items to enter, move to the next row of your invoice and press Ctrl-P to grab the information for another part.

DON'T GIVE ME ANY STATIC

Question: *I have an antiglare screen with a cord for draining static. I had it connected to the back of my computer's case, but a friend suggested that this would damage the components by sending electricity into the case. So now I have it on the antenna of my cordless telephone. Now my friend wants me to connect it to the bottom prong of a three-pronged plug. Is this a good and safe idea?*

JAWAAD AHMAD
READING, PENNSYLVANIA

Answer: Bet your cordless phone's range went up when you added that extra length of wire. As nearly as we

HOT TIP SELECTIVE PRINTING WITH WORD

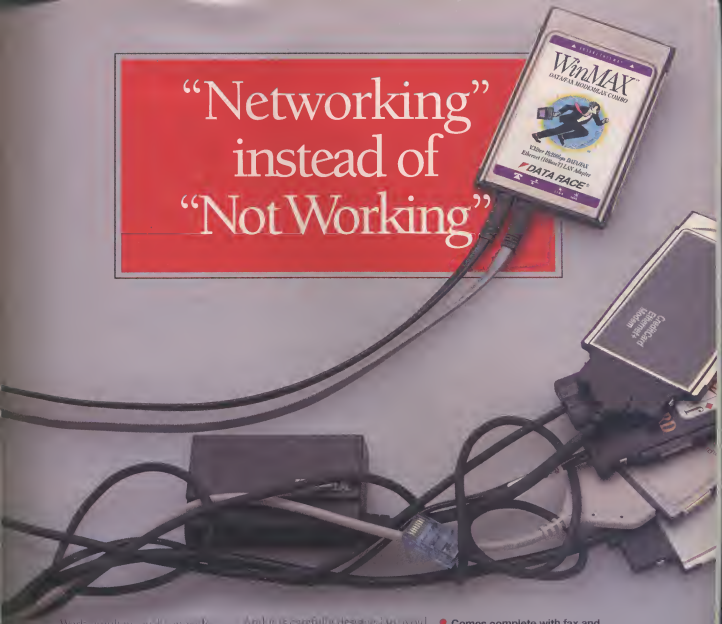
Problem: When you select a block of text and then try to print it, you want Microsoft Word 6.0 for Windows to automatically print the selection, instead of the whole document.

Solution: Create a macro and assign it to a button on the toolbar. Select Tools, Macro, and type SelectivePrint in the Macro Name box, then click on Create. Then, between the Sub MAIN and End Sub lines, type:

```
If SelType() = 1 Then FilePrint Else FilePrint .Range = 1
```

Close the window and save the macro. Assign it to a button by selecting Tools, Customize. From the Categories field, select Macros. Then, from the Macros field, drag SelectivePrint onto one of your Toolbars and drop it. Word will prompt you to assign an icon, so select the icon you want and click on Assign.

WOODY LEONHARD
CONTRIBUTING EDITOR



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HOT TIP ADDRESSING MICROSOFT WORD FOR WINDOWS PROPERLY

Problem: You don't like the way Word 6.0 for Windows formats addresses when you use the Envelopes and Labels option on the Tools menu.

Solution: Fixing this is as simple as modifying a style. Open a new document using the same template from which you usually get addresses. Select Format, Style. In the List area, check All Styles so Word will display all the available styles. Scroll through the styles and find Envelope Addresses. Click on the Modify button, and check Add to Template. Make the formatting changes you want. Select Save All, or quit Word and respond Yes to the Save Template question. Voilà! Your envelopes will be printed in the new style. You can also modify the Envelope Return style in the same fashion. If you print envelopes from multiple templates, you must repeat these steps for each template.

RONNY RICHARDSON
VIA COMPUSERVE

can tell, those antiglare screens don't need to be grounded at all. Using our sophisticated electrical measurement tools (our hands), we've tested numerous antiglare screens for the presence of static electricity. We found none, so there's nothing to drain.

If there were, it would be safe to ground that wire to your computer's case. If the enclosure is properly designed, it's electrically isolated from the static-sensitive components on the inside, and grounded to the grounding prong on your duplex outlet. So the enclosure should make a simple, out-of-the-way place to hook the wire.

LET'S DO LUNCH

Question: *Every time I access Windows' Calendar I get a new (untitled) calendar. This is annoying, since I want to keep one personalized calendar. Is there any easy way to modify Windows so that I get my own calendar?*

HENRI VELLMURE
LIGHTHOUSE POINT, FLORIDA

Answer: Yup. Just open the calendar file (it has a CAL extension) instead of opening the Calendar application. For example, let's say you open Calendar and create your own 1995 calendar of major events. (Calendar's View offers Day or Month views.)

CONTACT GET IN THE QUEUE

Got a question, tip, or step-by-step solution? Send it to us right away! We pay $50 and up for tips and Step by Steps that we publish. No question is too simple or too difficult, so go ahead, challenge us. We publish tips on using undocumented features in any major app, and some minor ones as well. Our address is: Q&A, *PC Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404. Better yet, use e-mail: CompuServe at 72241,2220; America Online at HelpPCC; or contact us via the Internet at yli-ron@pcc.ziff.com. Or send a fax to (415) 578-7029. Don't forget to include your address and a daytime phone number.

You then save it in the \WINDOWS directory as EVENTS.CAL. Next, create a Program Manager item for it. To do this, go to Program Manager and open your Main program group. Select File, New, Program Item. In the resulting Program Item Properties box, under Description, type My Events Calendar; then, under Command Line, type \WINDOWS\EVENTS.CAL, and for Working Directory, type \WINDOWS.

Then click on OK. A new icon labeled My Events Calendar should appear in your Main group. When you double-click on that icon, you'll open your personal calendar.

Or you can create your own CAL file and save it. In Program Manager, click on the calendar icon and then choose Properties from the File menu. In the command line space after CALENDAR.EXE, type the path and name of your CAL file and press enter. Voilà.

Actually, it sounds like you need a PIM. But this will work, if you can stand the eyesore.

SMART QUOTE, DUMB TRANSFER

Question: *When I cut text from Microsoft Word and paste it into Lotus Notes, all the apostrophes disappear. Why?*

KENYON PAYNE
VIA COMPUSERVE

Answer: The apostrophes are of the curly type, and they don't transfer very well. Neither do "smart quotes," those curly quotation marks. We recommend disabling the Smart Quote feature in Word (who needs it, anyway?). To do so, select Tools, AutoCorrect, and disable the "Change Straight Quotes to Smart Quotes" option.

Edited by JAMES OLIVER CURY. *Technical expertise provided by* ED BOTT, RICK DOBSON, MATTHEW LAKE, YAEL LI-RON, BENJAMIN F. MILLER, SCOTT NAYLOR, JEFF PROSISE, *and* JOHN WALKENBACH.

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Spec Watch Before your next hardware investment, check out our recommended specs:

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AT THESE PRICES, YOU MIGHT AS WELL GET COLOR

Ink Jet Printers: Affordable and Sharp

You want the crisp, rich quality of a laser printer, but you don't want to pay a laser price. Stop moping. Just head to the nearest computer store and buy an ink jet printer. Still, you want to be sure you're getting the right unit for your needs. So here are the key factors to consider. The biggest advantage of ink jet printers is that—aside from offering top-quality monochrome printing—most deliver great color for less than $500. If color is important to you, then make sure your ink jet provides it with a simple swap of the ink cartridge. No additional hardware should be required. Hewlett-Packard's DeskJet 540 offers a color upgrade kit for around $50. You won't get professional or photographic-quality color, but when you print at a resolution of 300-by-300 dpi, your presentations and charts will look much more impressive and distinct.

The critical factors for no-compromise, laser-like text are a separate black ink cartridge and a minimum 600-by-300-dpi output. Look for a black-and-white printing speed of at least four pages per minute, and a color printing speed of one to two minutes per page.

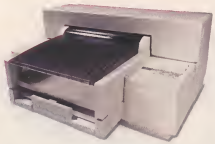
Other factors to consider when purchasing a printer include the length of your documents and the type of output you create. If you regularly crank out multipage reports, get an automatic sheet feeder and a paper tray that holds 100 sheets. Ideally, you should be able to print on labels, envelopes, and overhead transparencies, as well as on standard paper. Ink-jet technology is so flexible that in the near future you'll even be able to print onto cloth.

Make sure your printer comes with a full set of drivers for Windows, OS/2, or whatever operating system you use. Also, look for optional software that acts like an interior decorator—such as Canon's Color Advisor, available with the Canon BJC600e. It lets you specify the type of document you're printing and the desired output quality, and makes you look like a pro—even if you're color-blind.

The sweet spot for ink jets comprises the combination monochrome/color desktop models that fall in the $350 to $500 range. These printers deliver something a laser simply can't: color printing at a great price. ADAM MEYERSON

INK JET PRINTERS

FAST, COLORFUL, AND THE **PRICE IS RIGHT**



USABILITY:
- **A. Paper Tray:** Multipage sheet feeder.
- **B. Paper Tray:** Envelope option.
- **C. Software:** Color advisor software.

FEATURES:
1. **Fonts:** 25 internal, 10 TrueType.
2. **Printer Language:** PCL 5 built in with PostScript Level 2 option.
3. **Cartridges:** Separate black ink cartridge.
4. **Consumables:** Able to print on transparencies, glossy paper.
5. **Interface:** Network option.
6. **RAM:** Expandable to 24MB.

DECISION MAKER

1 What's more important?	2 Primary types of documents?	3 This is a minimum configuration:	4 Look for these features . . .
Black & White	Simple Text	4 ppm to 6 ppm, 512K to 1MB of RAM, 300 dpi	**Usability:** B **Features:** 1, 2, 3
Black & White	Complex Text, Charts & Graphics	4 ppm to 6 ppm, 4MB of RAM Expandable to 8MB, 600 dpi	**Usability:** A, B **Features:** 1, 2, 3, 4, 5
Color	Spot Color & Text	1 to 2 Minutes per Page, 512K to 2MB of RAM, 300 dpi	**Usability:** B, C **Features:** 1, 2, 3
Color	Full-Page Color	2 Minutes per Page, 8MB of RAM Expandable to 12MB, 600 dpi	**Usability:** A, B, C **Features:** 1, 2, 3, 4, 5, 6

Direct to You

SPEC WATCH:
Don't Settle for Less than These Specs

DESKTOP SYSTEMS

WHETHER A 486 OR PENTIUM, **STOCK WITH RAM**

USABILITY

A. BIOS: Flash BIOS for easy upgrade.
B. Case: Tool-free cover removal.
C. CPU: ZIF CPU socket.
D. RAM: Easy access to SIMMs.
E. Hard Drive: Enhanced IDE.

FEATURES

1. **CPU:** Upgradable to Pentium, 256K cache.
2. **RAM:** Expandable to 64MB.
3. **Monitor:** 17-inch.
4. **Monitor:** 21-inch.
5. **Video:** 64-bit VL-bus or PCI accelerator with 2MB of RAM.
6. **Video:** 64-bit VL-bus or PCI accelerator with 4MB of RAM.
7. **Hard Drive:** Enhanced IDE or SCSI-2.
8. **Sound:** 16-bit sound card (Sound Blaster compatible).
9. **CD-ROM:** Quad-speed EIDE or SCSI drive.
10. **Slots:** Three PCI or VL slots.
11. **Ports:** Two serial, one parallel, keyboard, mouse.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
Text & Numbers	Word Processing & E-mail	66MHz 486DX, 8MB of RAM, 340MB Hard Disk, 15-inch Monitor	**Usability:** A, B, C, D, E **Features:** 5, 7, 8, 9, 10, 11
	Spreadsheets & Databases	Pentium 75, 16MB of RAM, 500MB Hard Disk, 15-inch Monitor	**Usability:** A, B, C, D, E **Features:** 1, 2, 4, 6, 7, 8, 9, 10, 11
Graphics, Design & Multimedia	Drawings, Presentations, & Flowcharts	Pentium 75, 16MB of RAM, 500MB Hard Disk CD-ROM Drive	**Usability:** A, B, C, D, E **Features:** 2, 4, 6, 7, 8, 10, 11
	CAD, 3-D Rendering, & Image Editing	Pentium 90 or 100, 32MB of RAM, 1GB Hard Disk, CD-ROM Drive	**Usability:** A, B, C, D, E **Features:** 1, 2, 4, 6, 7, 8, 10, 11

NETWORK SERVERS

THE **PENTIUM** IS STANDARD EQUIPMENT FOR MOST SERVERS

USABILITY

A. BIOS: Flash for easy upgrades.
B. Enclosure: Tool-free removal.
C. CPU Socket: ZIF.
D. SIMMs: Easily accessible.
E. Drive Bays: Easily accessible.

FEATURES

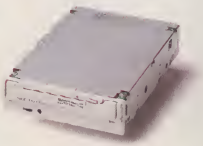
1. **CPU Cache:** Expandable to 1MB.
2. **Upgrade Potential:** Pentium upgradable.
3. **Interface:** Wide SCSI-2.
4. **RAID:** Level 3 or 5.
5. **RAM:** Expandable to 128MB.
6. **Bus Slots:** Eight EISA with two PCI.
7. **Internal Bays:** Two full-height 5.25-inch, two 3.5-inch.
8. **External Bays:** Two half-height 5.25-inch with front-panel access.
9. **Backup:** DAT.
10. **Network Card:** One 16-bit.
11. **Network Cards:** Two 16-bit.
12. **Protection:** UPS.

DECISION MAKER

1 How big is your network?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
20 or Fewer Clients	File Storage	66MHz 486DX2, 16MB of RAM, 1GB Hard Disk	**Usability:** A, B, C, D, E **Features:** 2, 5, 6, 7, 9, 10, 12
	Application Services	60MHz Pentium, 16MB of RAM, 1GB Hard Disk	**Usability:** A, B, C, D, E **Features:** 1, 3, 4, 5, 6, 7, 9, 10, 12
21 or More Clients	File Storage	60MHz Pentium, 32MB of RAM, 2GB Hard Disk	**Usability:** A, B, C, D, E **Features:** 1, 3, 4, 5, 6, 7, 8, 9, 10, 12
	Application Services	90MHz Pentium, 64MB of RAM, 4GB Hard Disk, RAID Level 5	**Usability:** A, B, C, D, E **Features:** 1, 3, 5, 6, 7, 8, 9, 11, 12

CD-ROM DRIVES

DEMAND DUAL- OR QUAD-SPEED AND **MPC 2** COMPATIBILITY



USABILITY

A. Door Cover: Double doors on drive to deter dust.
B. Control: Audio output jack and manual volume control.
C. Installation: IRQs set through software, not jumpers or dip switches.

FEATURES

1. **Performance:** 200ms access time or faster.
2. **Interface:** SCSI-2.
3. **Buffer:** 64K or larger.
4. **Buffer:** 256K or larger.
5. **Compatibility:** MPC 2.
6. **Compatibility:** High Sierra and ISO-9660.
7. **Compatibility:** CD-Audio and Kodak Photo CD.
8. **Applications:** Bundled CDs.

DECISION MAKER

1 What's more important?	2 What kind of titles?	3 This is a minimum configuration:	4 Look for these features . . .
Multimedia	5 or More Commercial Titles	Quad-speed Drive with 150Kbps to 600Kbps Transfer Rate	**Usability:** A, B, C **Features:** 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	**Usability:** A, B, C **Features:** 1, 2, 4, 5, 6, 7, 8
Text & Static Images	5 or More Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	**Usability:** A, B, C **Features:** 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	**Usability:** A, B, C **Features:** 1, 2, 4, 5, 6, 7

MODEMS

WHEN IN DOUBT, GET THE **FASTEST** YOU CAN FIND

USABILITY

A. Display: Labeled LCD on external models.
B. Compatibility: Fallback transmission rates.
C. Software: Communications software for data and fax.
D. Port Selection: COM1 through COM4.

FEATURES

1. **Compatibility:** V.32 bis, V.42 bis, V.42, ITU-T Group 3, Class 1, Class 2, Hayes command set.
2. **Compatibility:** V.34.
3. **Audio:** Integrated voice, data, and fax.
4. **Speed:** 16550 UART.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
Remote Access	Small Downloads, Short Sessions	14.4Kbps with Fax	**Usability:** A, B, C, D **Features:** 1, 3, 4
	Large Downloads, Long Sessions	28.8Kbps with Fax	**Usability:** A, B, C, D **Features:** 1, 2, 3, 4
Online Services	Research, E-mail, Small Downloads, Chats	14.4Kbps with Fax	**Usability:** A, B, C, D **Features:** 1, 3, 4
	Internet/Web, ftp, E-mail, Downloads	28.8Kbps with Fax	**Usability:** A, B, C, D **Features:** 1, 2, 3, 4

Sowing The Seeds Of Quality
UP TO
120
MHz
PENTIUM
intel inside
pentium

Find Value
Microsoft BOB on Board.
THE REAL 3 YR WARRANTY

Let's talk about a place called Home... The place you'd rather be when you're stuck at the office... Where time flies by and every moment counts... Where compromise is king and majority rules... Where dreams are born and the sound of laughter never dies...

— O.K., we won't bore you with flowery phrases. But you've got to admit, your home is a pretty special place! So why settle for anything less from the computer you put in it?...

Water, Sunshine And A Whole Lotta Software...

That's how *our* garden of Home PCs grows. We start by pouring on the PCI — giving you the fastest information flow possible. Next we add hot IntelDX2™, Intel DX4™ and Pentium™ processors for blazing clock speeds and performance that cooks. Then, just as these systems are starting to sprout, we give them double- and quad-speed CD-ROM drives. And since we've got a green thumb for this multimedia thing, we also sprinkle each Home PC with some of your favorite Microsoft® software.

And While We're On The Subject...

Don't you just *love* software? All it takes is a little bit of the stuff to make an ordinary computer bloom into a prize-winning PC. If you think about it, software is almost like a fertilizer for your system... except it smells a lot better. So, what kind of software goes on our *Home PCs*? — We thought you'd never ask! The Microsoft Family Bundle is a veritable *bouquet* of interactive programs. You'll just *love* digging into CD-ROM titles like Encarta™, Works, Money, Scenes, Dangerous Creatures and Golf. But before you get your hands *too* dirty — check out some of the *other* goodies we've planted!

Enjoy Multimedia In Your Own Back Yard

It doesn't take long to realize that multimedia is deeply rooted in these Home PCs. In fact, depending on its configuration, your new power flower may be found "sprouting off" with a 32-voice wave-table sound card and Altec Lansing Speakers! Plus, every MidWest Micro Home PC features a 9624 or 14.4 fax modem with voice-mail that not only sends and receives at speeds up to 57,600 bps, but also acts as a personal answering machine — so you can keep the calls you *don't* want to miss... and weed out the ones you do!

It's time to pick a PC called Home... The place you'd rather be when you're stuck at the office... Where processors fly and every modem talks... Where you ***never*** *have to compromise quality for a low price... Where imaginations are reborn and the sounds from your stereo speakers never die...*

Accept only the finest... Caviar

ENHANCED IDE

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M05

Spruce Up Your Working
JONES
A.P.A.
BOOKSHELF
Microsoft
ENCARTA
"It's darn fast and darn cheap."
— PC Computing, April 1995
"The Elite P5-90 is one of the fastest computers we've tested."
— PC World, January 1995
PC WORLD
TOP 20
Power Desktops
intel inside
pentium
PROCESSOR
ENHANCED
IDE
WESTERN DIGITAL
Caviar
WD WESTERN DIGITAL

Environment With An Office PC

Let's face it, choosing a business computer is no picnic. That's why we offer a wide range of Office PCs with just the right tools for your business needs. And with one of these systems on ***your*** *side of the fence, work may seem a little less like....****work****!***

You Really Need To Get Out More...

And so you shall. Out of an "almost big enough" hard drive and into a roomy alternative. Out of your flimsy warranty program and into MidWest's Real 3 Year coverage. And *definitely* out of that "faster means too expensive" state of mind. We have no intentions of cramping your style. That's why we furnish our Office PCs with the biggest and best of absolutely everything! We're talking hard drive capacities up to 4.3 Gb, modem speeds up to 115,200 bps and enough business software to expand *anyone's* horizons! But before you think about expanding your *budget*, check out our down-to-earth PC prices.

Let's Skip The Formalities

You won't find any bugs in *these* high-performance systems. Every MidWest Micro Office PC features a 32-bit PCI Local Bus for sizzling video and peripheral output. And our *Pentium*™ based Office PCs are *really* breaking new ground with 64-bit video accelerators, 75 MHz, 90 MHz, 100 MHz and 120 MHz processors — even 16 Mb of RAM and up! Who says a serious business computer has to be stuffy?

Find A Shady Spot And Get Back To Work

We guess you could say with an Office PC, your possibilities are **wide open**. Just choose your processor, hard drive, etc. and have a little fun. If a change of scenery sounds good to *you*, don't let the grass grow under your feet — call MidWest Micro and order an Office PC today.

THE REAL 3 YR WARRANTY

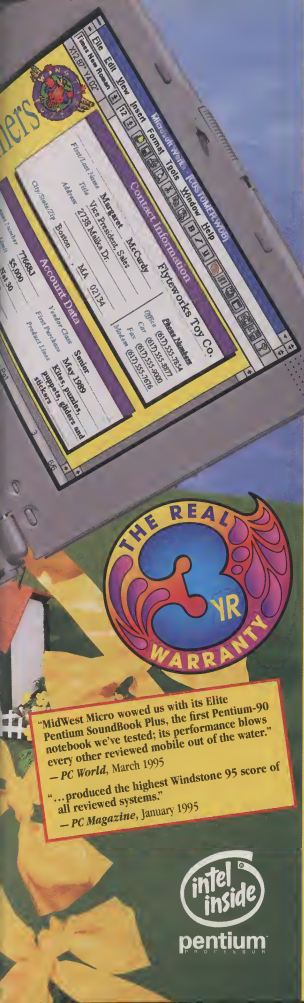
MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M05

New!
PERSONAL
TouchPad
POINTING
DEVICE
Sky-High Performance—
No Strings Attached



Don't...Look...Down...

Why should you? *You're* moving *up* in this fast-paced world. You just need a notebook computer designed for more demanding altitudes. One with so many advanced features, it raises mobile computing to brand new heights. A portable that has no problem whatsoever with clock-tripling speeds up to 100 MHz! A notebook that when left without an outlet in sight replies, "Ten bucks says *you* run out of energy before *I* do."...Well it just so happens, we *have* such a notebook. We like to call it the SoundBook II.

Who Said Anything About The Sky Being The Limit?

We say there shouldn't *be* a limit to what your notebook computer can do! That's why we built the SoundBook II with plenty of ports, 16-bit stereo sound and lightning-fast Intel® processors up to DX4-100! Plus, two convenient RAM compartments make it a breeze to expand this SoundBook's 4 Mb memory to a lofty 36 Mb! And if you think *that* sounds cool, here's something that'll *really* blow your mind.

Winner: Most Congenial

Aside from this SoundBook's countless other talents, it also comes with Personality Modules. These compact peripherals pop in and out of the SoundBook II faster than you can say "My, how convenient!" Just plug your AC adapter or floppy drive into the SoundBook's universal drive bay, and say good-bye to bulky external components! Then choose from additional modules including a 3.5" CD-ROM drive, an extra hard drive and even an extra battery. Speaking of convenience, if tiny trackballs leave you at the end of your rope, you'll love this SoundBook's easy-to-use Personal TouchPad. With this touch-sensitive pointing device, your cursor will never get away from you again!...But your new *notebook* just might — at 6 lbs. the SoundBook II is our lightest SoundBook yet!

Look What Else Just Blew In

Also defying the laws of gravity and speed is the SoundBook Plus based on Intel's Pentium™ Processor. This MidWest favorite features 75 MHz and 90 MHz Pentium Processors coupled with PCI Local Bus Video and hard drive control. And since all our notebooks now come with a three year parts and labor warranty, you're guaranteed our highest level of coverage — no matter which SoundBook you choose. For the best notebooks at the lowest prices, all you need to do is look *up*...our toll-free number, that is. (And since we put it on every page, that shouldn't be too hard.) Call MidWest Micro today — then get ready to grab your new SoundBook and run!

MIDWEST MICRO
IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M05

MidWest Micro Home PCs

DX2-50 $1499
#008740
- IntelDX2™ 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta™, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Digital Quality Speakers
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS® 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 $1599
#008741

DX4-100 $1999
#008705
- IntelDX4™ 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Altec Lansing® Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX4-75 $1899
#008704

P5-75 $2299
#008742
- Intel® 75 MHz Pentium™ Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-60 $2199
#008743

P5-90 $2599
#008744
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI® MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-100 $2799
#008745

P5-100 $3499
#008758
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1.2 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- Microsoft Family Bundle Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16 Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-90 $3199
#008759

P5-120 $3799
#008760

MidWest Micro Office PCs

DX2-50 PCI $1199
#008746
- IntelDX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- 3.5" Disk Drive
- 14" SVGA .28 NI Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS® Works for Windows™ 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1299
#008747

DX2-50 PCI $1499
#008713
- IntelDX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf® '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1599
#008714

DX4-75 PCI $1799
#008715
- IntelDX4 75 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1749
#008716

DX4-100 PCI $1899
#008717

All Systems with a CD-ROM include TestDrive CD Software and Microsoft Home CD Sampler

MidWest Micro Office PCs (Continued)

DX4-100 PCI $1999
#008718
- IntelDX4 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

P5-75 $1999
#008748
- Intel 75 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-60 $1899
#008749

P5-75 $2399
#008750
- Intel 75 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-90 $2499
#008751
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional ™, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 $2999
#008752
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 $3399
#008753
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 10-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-90 $3199
#008754

P5-100 $3999
#008761
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1.6 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb VRAM
- Quad Speed CD-ROM Drive
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 28.8 SVR Fax Modem
- 3.5" Disk Drive
- 17" .26 1600 x 1200 ExactMatch Color Monitor
- 10-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-90 $3799
#008762

P5-120 $4299
#008763

Customizing Your System
If you don't see a system configuration which meets your needs, we'll be glad to customize a system for you. Choose your own case design, amount of RAM, hard drive size and other add-ons such as modems and multimedia kits.

Monitor, Keyboard & CD-ROM Upgrades
Ask your sales representative how you can upgrade your monitor to a 17" or a 21" Monitor, your keyboard to a Microsoft Natural Keyboard, and your CD-ROM from a double speed to a quad speed.

15" to 17"	$205
15" to 17" ExactMatch	$309
17" to 21" ExactMatch	$609
Double Speed to a Quad Speed CD-ROM	$49
Microsoft Natural Keyboard	$59

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M05

MidWest Micro SoundBook Plus Based On Intel's Pentium™ Processor

- Intel® Pentium™ 90 or 75 MHz Processor
- 64-Bit, 256K Synchronous Burst External Cache
- 64-Bit, 8 Mb RAM (expands to 40 Mb)
- 10.3" Dual-Scan or 10.4" Active-Matrix VGA Display
- PCI Local Bus Video with 1 Mb Viden RAM
- PCI Local Bus HDD Controller
- 16-Bit Stereo Audio (Sound Blaster & Windows™ Sound System Compatible)
- Built-in Stereo Speakers & Microphone
- External Jacks for Line In & Line Out
- 3.5" Built-in Disk Drive
- User Replaceable Hard Drive
- Two Type II/One Type III PCMCIA Slot
- Integrated Pointing Device
- NiMH Battery & AC Adapter
- Advanced Power Management
- Bi-directional Parallel Port
- High Speed 16550 UART Serial Port
- Infra Red Wireless "IR" Interface
- External VGA & Keyboard/Mouse Port
- MS-DOS® 6.22 & WFW 3.11
- Microsoft® Works for Windows 3.0 & Golf
- Lotus® Organizer
- Weight: 6.8 lbs.
- Carrying Case
- The Real 3 Year Warranty

intel inside pentium PROCESSOR

Dual-Scan Color

Model	Item #	Price
P5-75 with 340 Mb HDD	#008090	$2999
P5-90 with 340 Mb HDD	#008029	$3299
P5-90 with 520 Mb HDD	#008025	$3499
P5-90 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem	#008101	$3999

Active-Matrix Color

Model	Item #	Price
P5-75 with 340 Mb HDD	#008091	$3999
P5-90 with 520 Mb HDD & 16 Mb of RAM	#008027	$4799
P5-90 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem	#008102	$4999
P5-90 with 720 Mb HDD, 32 Mb of RAM & PCMCIA 14.4 Fax Modem	#008103	$5799

Options

Option	Item #	Price
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16 Mb RAM Card	#002559	$739
Mobile Max PCMCIA 130 Mb HDD	#004805	$289
Mobile Max PCMCIA 170 Mb HDD	#004806	$345
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Dual-Scan Color

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DX4-100 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 S/R Fax Modem	#008109	$3299

Active-Matrix Color

Model	Item #	Price
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DX4-75 with 520 Mb HDD & 8 Mb of RAM	#008111	$3299
DX4-100 with 520 Mb HDD & 16 Mb of RAM	#008112	$3799
DX4-100 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem	#008113	$3999

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PCMCIA 14.4 Fax Modem	#002624	$129
PCMCIA Combo Ethernet Adapter	#001954	$139
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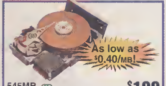

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730MB	IDE	WD2700A	10ms	3.5" 1"H	255
850MB	IDE	WD2850A	10ms	6.5" 1"H	275
1080MB	IDE	WD31000A	10ms	3.5" 1"H	385
1280MB	IDE	WD31200a	10ms	3.5" 1"H	399
CONNER					
425MB	IDE	CFS425A	14ms	3.5" 1"H	$185
540MB	IDE	CFA540A	14ms	3.5" 1"H	205
850MB	IDE	CFA850A	10ms	3.5" 1"H	269
1080MB	SCSI	CFP1080S	10ms	3.5" 1"H	509
1275MB	IDE	CFA1275A	10ms	3.5" 1"H	399
2147MB	SCSI	CFP2105S	8.5ms	3.5" 1"H	965
4294MB	SCSI	CFP4207S	9ms	3.5" HH	1,819
Maxtor					
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425MB	IDE	MX7425AV	12ms	3.5" 1"H	195
540MB	IDE	MX7540AV	12ms	3.5" 1"H	209
850MB	IDE	MX7850AV	12ms	3.5" 1"H	279
1260MB	IDE	MX71260A	12ms	3.5" 1"H	419
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1052MB	SCSI	ST31230N	9ms	3.5" 1"H	499
1083MB	IDE	ST31220A	12ms	3.5" 1"H	375
2100MB	SCSI	ST32430N	9ms	3.5" 1"H	959
2145MB	SCSI*	ST32550N	8ms	3.5" 1"H	959
4294MB	SCSI*	ST15150N	8ms	3.5" HH	1,599
4294MB	SCSI	ST15230N	9ms	3.5" HH	1,399
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32Kx8 (3 3V)	–	–	14 50	–
64Kx1	–	11 00	9 00	8 00
64Kx4	–	11 00	9 00	8 00
16Kx4	–	8 00	7 00	6 00
128Kx8	–	59 00	39 00	29 00

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	50NS	60NS	70NS	80NS	100NS
1Megx1	-	6 85	6 45	5 95	4 95
1Megx4	–	49 00	39 00	30 00	–
1Megx4 (Zip Pk)	–	24 00	22 00	21 00	–
256x4(Page Dip)	–	7 25	6 75	6 50	5 95
256 4(Static Dip)	-	–	6 95	–	-
256x4(Page Zip)	–	8 25	9 00	6 95	–
256x4(Video Zip)	–	-	12 95	11 85	9 95
256x8(SOJ)	-	28 00	24 00	–	–
256 x1	–	3 25	2 95	2 75	2.25
64x4	-	–	–	3 75	–
64x1	–	-	–	–	2 00
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1Meg x 9 (9 chip)	–	49 00	46 00	43 00	41 00	39 00
4Meg x 9	–	–	154 00	149 00	139 00	–
16Meg x 9 (9 chip)	–	–	–	669 00	–	–

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256 x 36 1 mg	–	–	–	69 00	59 00	–
512 x 36 2 mg	–	–	–	89 00	79 00	–
1 meg x 36 4 mg	–	–	189 00	179 00	179 00	–
2 x 36 8 mg	–	–	379 00	364 00	364 00	–
4 x 36 16 mg	–	–	569 00	549 00	549 00	–
8 x 36 32 mg	–	–	1189 00	1149 00	1149 00	–
16 x 36 64 mg	–	–	2799 00	2745 00	2745 00	–
1 x 32 4 mg	–	–	169 00	164 00	164 00	–
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Premmia LX P/60 MX4/66d 4/100T P/60	8 Meg	500887-003		338 00
	16 Meg	501340-002		479 00
	32 Meg	500987 005		958 00
	64 Meg	501589-001		Call
Premmia 4133, 4133S, 4/50d, 4/60d	8 Meg	501159-002		338 00
Premmia SE 4/33 4/66d P/60	16 Meg	501159-003		658 00
Premmia MTE 4/33, 4/66d P/60	32 Meg	501159-004		1149 00
Manhattan G V Series Server	64 Meg	501159-005		2298 00
Power Premium 3/33 4/33 4/33S 4/50d 4/66d Premium 486/25, 486/25E 486/33 486/33E Premium 386/33TE 486/25TE, 486/33TE Prem II 386/25 386/33 486/33 486 SX/20	8Meg	500780-001		378 00
Bravo 486/25 486/33	2 Meg Kit	500780 005		118 00
Advantage 486/25 486/33 486/33P 486 SX/20 Premium SE4/22	8Meg Kit	500780-001	64 pin	378 00
Premium SE 4/50, d 66d, P/60	1 Meg	500780 003	64 pin	59 00
Prem 386/33T, 386 SX16 Prem II 386SX 20 386/25	4Meg	500780-004	64 pin	189 00
Premmia GX P/90 P/100	8Meg Kit/16MegKit	501565-001/501566 001		378/699
	32Meg Kit/64Meg Kit	501567-001/501568-001		956/2298
AST Cupid Board	0 32 Meg	500818-001		179 00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #	PRICE
Z386/33, 25 20 33E	1Meg	ZA3800ME	59 00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK	180 00
Z386SX	2Meg	Z-605-1 modules	119 00

MAGNAVOX

286/386SX-16 386SX-20 486SX-20 & 386-33 *all are 72PIN SIMM*
1MEG – 59 00 4MEG – 180 00 8MEG – 349 00 16MEG – 659 00

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$139 00	**$238.00**	**$319.00**	**$499.00**	**$859.00**

PS/2 MCA 0-8MEG EXPANSION BD.

0-8Meg Extended and/or Expanded Memory for all IBM P/S2 Models 50, 50Z, 60, 55SX, 65SX, 16 Bit, 4 0 LIM Compat
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IBM PS/1, PS/2 MEMORY MODULES

IBM PART NO	WORKS WITH MODEL NO	PRICE
30F5348 (512K)	30 286	37 00
30F5360 (2Meg)	30 286 25-286, 50 MTHR BD	104 00
6450375 (1Meg)	80-041	79 00
6450379 (2Meg)	80-111 311 121 321 081 161	84 00
6451060 (4Meg)	80-A21 A-61 80 A31 80-111, 80-311	188 00
6450604/92G7196 (2Meg)	70-061 E61 121, 50Z 55SX 65SX, P 70, 55LS 65LS, X-Station 120 & 130 35SX 35LS 40SX	99 00
6450608 (2Meg)	70-A21, A-61, B-21 8-61 35SX 35LS 40SX Val Pt 325T	90 00
78X8955 (128K)	25	35 00
34F2933 (4Meg)	35SX, 40SX 55SX 65SX 55LS 65LS	175 00
87F9977/92G7199 (4Meg)	55SX 55LS, 65SX 40SX 35SX 35LS	175 00
1057035 (512K)	P/S1-286	49 00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	109 00
92F9694 (4Meg)	P/S1 & P/S1/386SX Model-2121	189 00
92G7200 (4Meg)	PSI Expert Consultant Willow	175 00
92G7201 73G3131 (4Meg)	Value Point Performance PC Server 4/66	175 00
73G3132/92G7203 (8Meg)	Value Point Performance PC Server 4/66	339 00
60G1622/92G7204 (16Meg)	Value Point Performance, PC Server 4/66	609 00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1239 00
6450902 (2Meg)	56 57 57SX,90 95 P 75 57SLC Value Point 77 486DX2 486SX SVR 85	90 00
6450128/92G7200 (4Meg)	57SX 90 95 P 75 57SLC 56 56SLC P/S1 386SX Mod-2123 2133, 2155 Val Pt 77, 486CS2, 486SX SVR85 Value Point 77 486DX2 486SX SVR 85	175 00
6450129/92G7428 (8Meg)	35SX 40SX	339 00
6450130/92G7202 (8Meg)	56 57 57SX 90 95 P-75 57SLC Value Point 77 486DX2, 486SX, SVR 85	339 00
6451158/92G7208 (4Meg ecc)	486 95XP 95A (install in pairs)	199 00
6451159 (8Meg ecc)	486 95XP 95A (install in pairs)	399 00
92G7209/32G3720 (16Meg ecc)	9595 OPT	749 00

IBM NOTEBOOK & LAPTOP MEMORY

07G1415/07G1420 (4Meg)	Thinkpad 750 C 700 C 720 C CL57SX	189 00
07G1416/07G1421 (8Meg)	Thinkpad 750 C 700 C 720, C, CL57SX	369 00
66G0095 (16Meg)	Thinkpad 750 C	669 00
66G0094 (4Meg)	Thinkpad 755 360 355 340 450	179 00
66G0094 (8Meg)	Thinkpad 755 360 355 340 450	340 00
66G0094 (16Meg)	Thinkpad 755 360 355 340 450	629 00
8189098 (4Meg)	Thinkpad 500 510CS (3 3 volt)	209 00
8189099 (8Meg)	Thinkpad 500 510CS (3 3 volt)	389 00
8189113 (16Meg)	Thinkpad 510CS (3 3 volt)	799 00
79F0999 (2Meg)	LX40 N33SX PS Note	103 00
79F1000 (4Meg)	LX40 N33SX PS Note Tkpd 350 350c PS Note 425	189 00
79F1001 (8Meg)	LX40 N33SX PS Note	349 00
Hard Drive (524Meg 710 Meg)	Thinkpad 750 755 360 355	949 00/1149 00
(4Meg/16Meg)	Thinkpad 755 Dimm Modules	209 00/699 00
(4Meg/16 Meg w/Adap	Thinkpad 755	289 00/749 00
60G0378 (8Meg)	Thinkpad 350 350c, PS Note 425	339 00
60G0378 (16Meg)	Thinkpad 350 350c, PS Note 425	569 00
92F8804 (2Meg)	N45SL	109 00

COMPAQ MEMORY MODULES

MODEL	AMT UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33 386/33L 486/25 486/33L, 486/50L System Pro	2Meg Module	115144 001	109 00
	8Meg Module	116561 001	399 00
	32Meg Module	116568-001	1399 00
DeskPro 386/33L 486/33L	(Exp Bd)	116569-001	279 00
DeskPro 386/25 386/20	1Meg Module	113131-001	79 00
	4Meg Module	113132-001	199 00
DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	149 00
	4Meg Exp Bd	113634-001	279 00
	1Meg Module	113646-001	79 00
	4Meg Module	112534-001	199 00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149 00
DeskPro 386/25E	4Meg Exp Bd	113645-001	279 00
	1Meg Module	113131 001	79 00
	4Meg Module	113132-001	199 00
DeskPro 286N 386N 386SX20 all "M" series, sytem LT series, all "I" series	1Meg Module	118688-001	59 00
	2Meg Module	118689-001	89 00
	4Meg Module	118690-001	169 00
	8Meg Module	128877 001	339 00
M Series Exp Bd	0-64Meg	129160 001	189 00
DeskPro 386/16	1Meg Kit	108071-001	99 00
	4Meg Kit	108072-001	299 00
	1-2Meg Exp Bd	108069-001	239 00
	4-8Meg Exp Bd	108070-001	437 00
DeskPro 286	512K Kit	113012 001	49 00
DeskPro 5/60 5/66M 5/66M (ALL OF THESE MACHINES USE THESE MODULES)	8Meg Kit	149911-001	389 00
Prosignia 5/60	16Meg Kit	149949-001	699 00
Proliant 100 5/60	32Meg Kit	149912 001	1356 00
Proliant 2000 4/30 5/66	64Meg Kit	149913-001	2516 00
Proliant 4000 4/50 5/66	128Meg Kit	149914-001	5799 00
Prolinea 386 3/25S, 3/252S	2Meg	141738-001	90 00
	8Meg	141742-001	316 00
Prolinea 486 4/25S 4/33 4/50 4/66, CDS	2Meg	141683-001	95 00
Enhanced Prolinea Prosario series	4Meg	141684-001	175 00
	8Meg	141685-001	339 00
Prosignia PC Server 486/33, 486 DX2/66	8Meg	141685-001	339 00
	16Meg	149320-001	599 00
	32Meg	149147 001	1199 00

COMPAQ LAPTOPS & NOTEBOOKS

LTE/286	4Meg Bd	117081-003	179 00
LTE/386S/20	4Meg Module	121125 002	209 00
LTE LITE/20 25 25C	4Meg Module	129769-002	209 00
LTE LITE/20 25 25C	8Meg Module	129769-003	389 00
LTE LITE/20 25, 25C	16Meg Module	129769-004	769 00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	189 00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	329 00
LTE LITE 425C/33C/25E/25L	16Meg Module	142337-004	639 00
SLT/286	4Meg Module	110237-001	199 00
SLT/386	2Meg Module	118304-001	109 00
SLT/386	4Meg Module	118305-001	219 00
Concerto LTE Elite	4Meg	144790-001	189 00
	8Meg	144790-002	369 00
	16Meg	144790-003	699 00
Contura 320, 325	2Meg	139497-001	99 00
	4Meg	139498 001	189 00
	8Meg	139499-001	339 00
Contura 400 410	4Meg/8Meg/16Meg		199/389/709
Contura 4/25 4/25C 4/25CX	4Meg	146520-001	189 00
	8Meg	146521 001	339 00
	16Meg	146531 001	699 00
Aero 4/25 4/33L	4Meg	190532 001	164 00
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T2000SXE/2200SX/T1800 1850 C 4Meg		PC-PA2001U 189 00	
T2000SXE/2200SX/T1800 1850 C 8Meg		PC-PA2002U 359 00	
T4400SX SXC T6400 T6600	4Meg	PC-PA2004U	189 00
T4400SX SXC T6400 T6600	8Meg	PC-PA2005U	359 00
T4400SX SXC T6400 T6600	16Meg	PC-PA2010U	689 00
T4500 C T4600 T4700 T1900 C, T1910 T1950 (3 3 v)	4Meg	PC-PA2012U	199 00
T4500 C T4600 T4700 T1900 C T1910, T1950 (3 3 v)	8Meg	PC-PA2013U	389 00
T4500 C T4600 T4700 T1900 C T1910 T1950 (3 3 v)	16Meg	PC-PA2014U	709
T4700 4800 4850 (Hard Drive)	524Meg/710Meg		949/114
T3400CT T2400 T3600	4Meg	PC-PA2018U	194 0
T3400CT T2400 T3600	8Meg	PC-PA2020U	350
T3400CT T2400 T3600	16Meg	PC-PA2021U	707
T3400CT	32Meg		1548 0
T3100SX	2Meg	PC15-PA8308U	55 0
T3100SX	4Meg	PC15-PA8310U	189 0
T3200	3Meg	PC6-PA7137U	110 0
T3200SX	2Meg	PC12-PA8307U	55 0
T3200SX	4Meg	PC12 PA8909	199 0
T5200/T8500	2Meg	PC10 PA8304U	114 0
T5200/T8500	8Meg	PC10-PA8313U	419 0

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT UPGRADED	MANU PART #	PRICE
ACER 730 735C 760 780	2Meg/4Meg/8Meg		109/209/3
ACER 750	4Meg/8Meg/16Meg		199/459/7
ALR Venture	4Meg	12407980	249 0
Altima Virage	4 Meg/ 16 Meg		199/6
Altima Virage II	4Meg/8Meg/16Meg		199/369/
AST Ascentia 900N 800N	4Meg/8Meg/16Meg		199/375/
AST Bravo & Explorer	4Meg/16Meg	501255-001 -002	189/6
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	189
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166 001 003	199/6
AST Power Exec 4/33SL	4Meg/16Meg	501318-001 002	194/7
AT&T Globalyst 200	4Meg/8Meg/16Meg		199/349/
AT&T Safari NSX/20	4Meg	PEC 37651	258 00
Austin DX4, DX2, SX2 SX Series	4Meg/16Meg		Call
Bondwell 8310, Plus	1Meg	23050-09100	69 00
Bondwell 8310V SX	1Meg		109 0
Bondwell 8310V SX	4Meg		229
Canon Innova Book 150	4Meg/16Meg		199/7
Canon Innova 486	2Meg/4Meg/8Meg		109/209/4
Canon Innova 486 10	4Meg/16Meg		189/
Canon Notejet 486	4Meg/ 8 Meg		199/3
Chaplet 486	4Meg/16Meg		199/
Chicony N85	4Meg/16Meg		199/679
Compuadd 425TX Notebook	4Meg/16Meg		Call
Contura 410c & cx	4Meg/8Meg/16Meg		199/369/
Dell Latitude M, MC, MCX	4Meg/8Meg/16Meg		219/449/
Dell Latitude XP, 475 4100, 4100CX	4Meg/16Meg		199/64
Dell Latitude 486 425 433C 433CX 450 450CX	4 Meg/16 Meg		199/679
DTK 4T100P Notebook	4Meg/8Meg/16Meg/32 Meg		Call
Epson ActionNote 650 850c	4Meg/8Meg/16Meg		209/389/6
Epson ActionNote 700, 700c 700cx	4Meg/16Meg		199/6
Epson ActionNote 4000 Notebook	6Meg		Call
Epson ActionNote 4LC/25, 4LC/33 4SLC/2-50			Call
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	109 00
Gateway 2000 Colorbook 4/33	4Meg/16Meg		199/679
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		186/1
Gateway 2000 486 Handbook	4Meg/16Meg		199/6
Goldstar GS520 386SX/16	4Meg	S386-4M	248 0
Grid 1720, 1750, 1755	1Meg		58 0
HP Omnibook 300 480 425	2Meg/4Meg		129/2
HP Omnibook 530, 600	4Meg/8Meg/12Meg		229/439/7
HP Omnibook 4000	4Meg/8Meg/16Meg		199/379/5
Leading Edge Aviva	4Meg/16Meg		199/679
Lexmark SE10	4Meg/8Meg		209/399
Magnavox Metalis	1 Meg/4Meg	286 386SX	109/19
Midwest Micro Elite SX 25 SX33, DX2 50 DX2-66	4Meg/8Meg/16Meg		199/389
Midwest Micro Elite 486 SLC 33 Subnotebook	4Meg/8Meg/16Meg		109/199/
Midwest Micro Elite Sndbk SX33 DX3 50, DX4 75, DX4 100	4Meg/8Meg/16Meg		199/319/
Midwest Micro Elite Sndbk Plus D5-75 D5 90	4Meg/8Meg/16Meg		199/389/
NCR Safari 3180	4Meg/ 8 Meg		238/44
NEC Prospeed 386	2Meg	PC31 21	118 0
NEC Prospeed 386	8Meg	PC31-22	399 0
NEC Prospeed 286 386SX 16 386SX 20	4Meg	PC21-22 PC43-22	199 0
NEC Ultralite Versa F V	4 Meg/8Meg/16Meg/20Meg	OP4104	183/359/739/91
NEC Versa Removable Hard Drive	340Meg/524Meg/710Meg		749/899/104
NEC Versa S	4Meg/8Meg/16Meg		209/379/79
Packard Bell 386SX 286	1Meg 4Meg	286 386SX	109/19
Packard Bell Statesman	2Meg/8Meg		119/38
Panasonic CF170 CF270 CF370	1Meg	CF-BA165	59 0
Panasonic CF380, CF480	2Meg/4Meg/6Meg		119/199/30
Panasonic CF V21P CF 580	4Meg/16Meg		219/
Sanyo 17/18 N8	2Meg	MBC NBMEM2	109 0
Sharp 6781 6881 8785 8700 6800 6741	2Meg/4Meg		109/19
Sharp 8150 8650 8680 7700 7760	4Meg/16Meg		199/67
Sharp 8700 & 8900	4Meg/8Meg/16Meg		199/378/6
Sharp PC-6220	1Meg	CE 8218	79 0
TI Travelmate 2000	1Meg	2568034 0001	79 0
TI Travelmate 3000	2Meg	2566996-1	84 0
TI 4000, TI 4000E	4Meg/16Meg		199/6
TI 4000M	4Meg/16Meg		219/79
Tandy 1510 2810 3810	1Meg		49 0
Tandy 2820 3820 3830	2Meg/4Meg/6 Meg		119/199/30
Twinhead Altima Compudyne 486SX DX Tandy 4860	4Meg/16Meg		199/679
Twinhead Slimnote 5	4Meg/8Meg/16Meg		199, 379, 64
Ultra 486 TS38	4Meg/8Meg/16Meg		249/459/89
Zeos 386SX Notebook (not the + version)	2Meg		108 00
Zenith Master Sport 386SX	2Meg	ZA-300-1	114 00
Zenith Master Sport SL SLE, 800 620 825NL	2Meg	ZA 4-4	119 00
Zenith Super Sport 286 286E	1Meg	ZA-180-66	99 00
286E, SX	2Meg	ZA-180 64	149 0
SX Alpha/SX Beta	2Meg	ZA 180-86/ZA 180 87	148 00
Zenith Z Note 425LN LNC LNP	4/8/16Meg		209/469/83
Zenith Z Star 4/33	2/8Meg		119/36

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28 8/28 8 Data/Fax Modem	379	Wavjammer™ (16 bit stereo sound card)	275
14 400/14 400 Data/Fax Modem	189	Multimedia Combo Sound/SCSI	489
Readwriter Card (15A Slot)	149	Type III 105 Mg Hard Drive	319
Lan Ethernet Combo	Call	Type III 130 Mg Hard Drive	399
Lan Ethernet (10 Base T)	189	Type III 170 Mg Hard Drive	439
Lan Ethernet (Coax)	169		

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Brother 630 631 641 645	–	–	89	135	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	69	–	–	–	189	–	–	–	–	-
Canon LBP 860	–	–	–	99	–	–	179	–	–	349	669	124
Canon LBP4, 4Lite, 4plus	–	–	159	219	–	–	–	–	–	–	–	
Epson 6000 Action Laser	–	–	–	139	–	–	229	–	–	–	–	
Epson Action Laser 1100, 1800	–	–	69	99	–	–	189	–	–	379	599	-
Epson Action Laser II	–	-	89	–	208	–	–	327	–			
Epson 8000	–	–	89	–	208	–	–	327	–			
Epson 1000, 1500, 5000, 5200	–	–	–	***119****	–	–	***238****	–	***Call***	–	–	-
HP 2 2D	–	–	–	109	–	–	189	–	–	–	–	
HP 3 3D 3P, 2P 2P+	–	–	–	99	–	–	169	–	–	–		
HP 4 4M 4SI 4SIMX 4P, 4MP	–	–	–	89	–	–	169	–	–	349	–	
HP 4L	–	–	50	-	–	–	–	–	–	–	–	
HP 3SI	–	–	69	–	–	–	169	–	–	349	–	
HP 4SI	–	–	–	89	–	–	175	–	–	349	–	-
HP Design Jet 600, 650, 200	–	–	–	89	–	–	175	–	–	349	–	
HP Deskjet 500 500C, 510 550 560	–	55	–	–	–	–	–	–	–	–	–	
HP Deskjet 1200C, 1200C/P	–	–	–	89	–	–	175	–	–	349	–	-
HP Paintjet XL300	109	–	–	–	–	–	289	–	–	469	837	
IBM Laser 4019 4019E	–	–	–	–	–	169	–	–	–	–	–	
IBM Laser 4029 4037	–	–	–	–	–	–	169	–	–	–	–	
IBM Laser 4039 4079	–	–	–	99	–	–	169	–	–	350	–	
Konica LP-3110	–	–	119	189	239	–	–	–	–	–	–	
NEC 90 290	–	–	–	139	–	–	–	–	–	–	–	
NEC 95 97	–	–	–	99	–	–	–	–	–	–	–	
Oki 400	–	–	–	84	–	–	–	–	–	–	–	
Oki 400E, 400EX 410E 410EX	–	–	135	189	–	–	–	–	–	–	–	
Oki 830, 840	–	–	–	109	–	–	–	–	–	–	–	
Packard Bell PB 9500	–	–	–	139	–	–	227	–	–	–	–	
Packard Bell 9815	–	–	–	159	–	–	269	–	–	–	–	
Panasonic 4420/4450I	–	–	–	129	–	–	229	–	–	–	–	-
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–	
Panasonic 4450	–	–	99	–	–	–	-	–	–	–	–	
Panasonic 4400/5400	–	–	89	129	–	–	229	–	–	–	–	-
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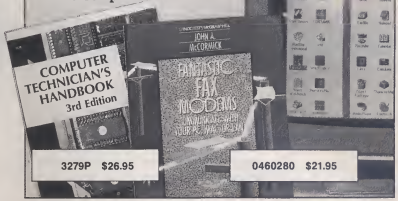

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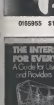

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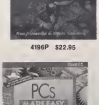

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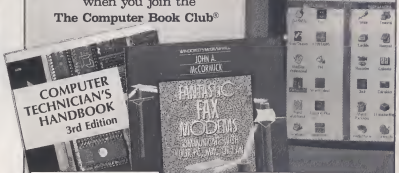

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NEW Aptiva 300 500 and 700 series					
4MB	n/a	$159	16MB	n/a	$509
NEW Eduquest 55					
4MB	74G1299	$174			
NEW Eduquest 30, 40 and 50 models					
4MB	60G0896	$174	16MB	60G0898	$549
PS/1 286, 386SX					
2MB	92F9935	$83	4MB	92F9694	$163
NEW Valuepoint Performance models					
4MB	92G9201	$179	8MB	92G7520	$354
PS/1 Consultant Essential Expert models x43 x44 PS/Valuepoint all models except Cxx models					
4MB	96F9290	$177			
16MB	96F9291	$609			
PS/1 Consultant, Essential Expert models					
16MB	96F9291	$609			
PS/2 25/286, 30/286					
2MB	30F5360	$79			
PS/2 35SX LS, 40SX 50Z 55SX LS 65SX LS 70 XStation					
2MB	6450604	$87			
PS/2 70 A21 A61 B21 B61 PS/Valuepoint Lxx models PS/1 Consultant Essential, Expert models					
2MB	6450608	$95			
PS/2 35SX, LS 40SX, 55SX, LS 65SX LS XStation PS/Valuepoint Cxx models					
4MB	34F2933 or 87F9977	$179			
PS/2 35SX LS 40SX, PS/Valuepoint					
8MB	6450129	$356			
PS/2 90 XP 95 XP P75 (pairs) 56 57 (all) PS/1 Pro M2123					
2MB	6450902	$85			
PS/2 90 XP 95 XP P75 (pairs) 56 57 (all models) PS/1 Consultant, Essential, Expert models, PS/1 Pro M2123					
4MB	6450128	$169	8MB	6450130	$356
PS/2 80-111 311 121 321 081, 161					
2MB	6450379	$88			
PS/2 80-A21 A31, A16					
4MB	6451060	$193			
Expansion boards for PS/2 80286 based models					
4-16MB w/4MB	6450609 (use 72 pin)	$299			
Expansion boards for PS/2 80386 based models					
2 14MB w/2MB	34F3077	$205			
4 16MB w/4MB	34F3011	$299			

LASER PRINTER MEMORY

Canon LBP 4					
1MB	n/a	$105	2MB	n/a	$159
Canon LBP 8II 8III III					
2MB	S63 1880	$119			
Epson ActionLaser 1000 1500					
512K	n/a	$35	2MB	n/a	$99
NEW Epson ActionLaser 1100					
2MB	n/a	$105	4MB	n/a	$159
Epson ActionLaser 1600					
4MB	n/a	$159	16MB	n/a	$609
HP LaserJet 4L					
1MB	C2024A	$48			
HP LaserJet IIP, III IIIP, IIID					
2MB	33475B	$95	4MB	33477B	$169
HP LaserJet II IID					
2MB	33444B	$95	4MB	33445B	$169
HP LaserJet IIISi 4 4M, 4Si 4SIMX, XL300 DeskJet 1200c					
1MB	C2063A	$48	2MB	C2064A	$94
4MB	C2065A	$174	8MB	C2066A	$339
NEW HP LaserJet 4P 4MP, Color LaserJet					
2MB	C3131A	$95	4MB	C3132A	$179
NEW HP DeskJet 500 500C 520 520C, 550C, 560 560C					
256K	22707B	$40			
IBM/Lexmark Laser 4019 (all models)					
2MB	1038675	$107	3 5MB	1039137	$167
IBM/Lexmark Laser 4029 (all models)					
2MB	1183334	$87	4MB	1183335	$157
IBM/Lexmark Laser 4039 4079 (all models)					
4MB	1328363	$157	8MB	1328365	$319
OkiLaser 400					
1MB	70014701	$69	2MB	n/a	$97
NEW OkiLaser 400e 410e					
2MB	n/a	$117	4MB	n/a	$197
OkiLaser 830 830 Plus 840					
2MB	n/a	$124	4MB	n/a	$209
Panasonic LaserPartner 4400 5400					
2MB	KX PEM1	$110	4MB	KX PEM2	$209
Panasonic LaserPartner 4410 4430					
2MB	KX P444	$115	4MB	n/a	$196
Panasonic LaserPartner 4450i, 4420					
2MB	KX P441	$116	4MB	n/a	$187
Texas Instruments MicroLaser XI					
1MB	2555739-0001	$49			

LAPTOP AND NOTEBOOK MEMORY

AST

NEW Ascentia 800n 810n	4MB	$185
	8MB	$359
	16MB	$609
NEW Ascentia 900n 910n	4MB	$205
	8MB	$359
	16MB	$609
NEW Bravo NB 486	4MB	$169
	16MB	$599
PowerExec 4/25SL, Color Plus	4MB	$185
	16MB	$629
PowerExec 3/25SL, 3/25SL C, EI	4MB	$149
	16MB	$629
Premium Exec 386SX/20, 25, 25C	4MB	$160

IBM

NEW ThinkPad 220	4MB	$238
ThinkPad 230Cs	8MB	$409
ThinkPad 300	8MB	$339
ThinkPad 340 355 360 730	4MB	$168
	8MB	$309
	16MB	$651
NEW ThinkPad 510	4MB	$199
	8MB	$359
ThinkPad 700 720 755 and CL57SX	4MB	$199
	8MB	$379
	16MB	$669
	32MB	$1399
ThinkPad 710T	4MB*	$179
	8MB	$315
N51 Notebook	2MB	$95
	4MB	$179
140SX N33SX, PS/Note 182	4MB	$146
	8MB	$288

ZENITH

Z Note 320L, Lb 325L Lx	2MB	$95
	8MB	$298
NEW Z Note 425 Series	4MB (3 3 V)	$155
	8MB (3 3 V)	$369
Z Sport 420S 425S	4MB	$189
Z Sport 325S	4MB	$189
MastersPort 386SL SLC SLe	2MB	$85
MastersPort 386SX	2MB	$85
NEW Z Star	4MB	$159
	8MB	$369

TEXAS INSTRUMENTS

TravelMate 3000 (all models)	2MB	$79
TravelMate 4000 (all models)	4MB	$189
	16MB	$959
NEW TravelMate 4000M	4MB	$198
	16MB	$799

WHY ADD MORE MEMORY?

Most applications run satisfactorily with 8MB, but in the long run 16MB is recommended

- Memory allows Windows & OS/2 to run faster
- Reduces your system's need to access the hard disk
- Utilize numerous & extensive applications at the same time

NEC

NEW Versa S	4MB	$199
	8MB	$319
UltraLite Versa (all models)	4MB	$189
	8MB	$349
	16MB (3 3 V)	$619
UltraLite III SL/25C	2MB	$85
	6MB	$329
	8MB	$340
UltraLite SL/20 SL/20P	2MB	$85
	6MB	$279
ProSpeed 286, 386SX/16	4MB	$179

COMPAQ

NEW Contura Aero 4/25 4/33c	4MB	$179
	8MB	$299
NEW Concerto 4/25 4/33	4MB	$175
	8MB	$365
Contura 3/20, 3/25, 3/25c	4MB	$148
	8MB	$298
NEW Contura 400 models	4MB	$180
	8MB	$365
	16MB	$651
Contura 4/25 4/25cx, 4/25c	4MB	$169
	8MB	$298
	16MB	$635
NEW LTE Elite	4MB	$174
	8MB	$315
	16MB	$598
LTE Lite 20 25, 25c, 25e	4MB	$200
	8MB	$349
	16MB	$729
LTE Lite 4/25c	4MB	$180
	8MB	$359
	16MB	$659

TOSHIBA

T2000, 2000SX SXe	4MB	$167
T2200SX T1800 Series	8MB	$317
NEW T2400 T2450	4MB	$184
	8MB	$354
T1200XE, 1600, 3100E	2MB	$89
T3100SX 3200SX, SXC	2MB	$115
	4MB	$147
T3300SL	4MB	$165
	8MB	$389
NEW T3400 T3600	4MB	$185
	8MB	$348
T4400 T6400 (all models)	4MB	$179
	8MB	$339
	16MB	$675
T1900 T4500 T4600	4MB (3 3 V)	$188
NEW T4700 T4800 T4850, T4900	8MB (3 3 V)	$349
	16MB (3 3 V)	$719
T5400 T5200 T5200C T8500	2MB	$87
	8MB	$347

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[illegible]0X2/50	10.3" Dual Scan	340MB	2829
[illegible]0X2/50	10.3" Dual Scan	520MB	3199
[illegible]0X2/50	10.4" Active	340MB	3769
[illegible]60X2/50	10.4" Active	520MB	4129
[illegible]60X4/100	10.3" Dual Scan	340MB	3619
[illegible]60X4/100	10.3" Dual Scan	520MB	3999
[illegible]60X4/100	10.4" Active	340MB	4489
[illegible]60X4/100	10.4" Active	520MB	4829

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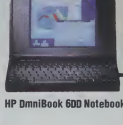
Processor	Screen	Hard Drive	Price
486DX2/50	8.5" Dual Scan	170MB	$2549
486DX2/50	8.5" Dual Scan	260MB	2829
486DX4/75	8.5" Dual Scan	170MB	3099
486DX4/75	8.5" Dual Scan	260MB	3379



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HP DeskJet 320 w/Sheet Feeder	359.99
HP DeskJet 540	289.99
HP DeskJet 560C	479.99
HP DeskJet 1200C	999.99
HP DeskWriter 320	299.99
HP DeskWriter 320 w/Sheet Feeder	359.99
HP DeskWriter 540	289.99
HP DeskWriter 560C	479.99
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- Integrated speaker and microphone
- MS DOS, Windows 3.1, Windows Sound System, MS Video for Windows Run Time

Processor	Screen	Hard Drive	Price
[illegible]ntium 75	9.5" Active	340MB	$ 4729
[illegible]ntium 75	9.5" Active	540MB	5099
[illegible]ntium 75	9.5" High Res.	540MB	5479
[illegible]ntium 75	9.5" Active	810MB	5599
Pentium 75	9.5" High Res.	810MB	5989

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- ▲ Fax modem
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Processor	Hard Drive	Price
486DX2/66 Minitower	420MB	$1449
P60 Minitower	420MB	1799

Business Lease: $50/mo.
NEC monitors start at $309.99

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as low as **$3219** Versa M

- 2 Type II or 1 Type III PCMCIA slot
- Removable hard drive, floppy & screen
- Integrated speaker and microphone
- MS DOS, Windows 3.1, Windows Sound System, MS Video for Windows Run Time

Processor	Screen	Hard Drive	Price
[illegible]60X4/75	9.5" Dual Scan	340MB	$ 3219
[illegible]60X4/75	9.5" Active	540MB	4199
[illegible]60X4/75	9.5" High Res.	540MB	4589
[illegible]60X4/100	9.5" True Color	540MB	4819
[illegible]60X4/100	9.5" Active	810MB	5049
[illegible]60X4/100	9.5" High Res.	810MB	5429

Versa V

- ▲ 4MB RAM expandable to 20MB
- ▲ 2 Type II or 1 Type III PCMCIA slot
- ▲ Removable hard drive
- ▲ Removable floppy – add second battery
- ▲ MS-DOS 6.21, Windows 3.1

Processor	Screen	Hard Drive	Price
486DX2/50	9.5" Dual Scan	250MB	$2369
486DX2/50	9.5" Dual Scan	340MB	2499
486DX2/50	9.5" Active	250MB	2889
486DX2/50	9.5" Active	340MB	3029
486DX2/50	9.5" Active	540MB	3399
486DX4/75	9.5" Active	540MB	3399
486DX4/75	9.5" Active	540MB	3779

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486DX4/100	10.4" Dual Scan	340MB	$4599
486DX4/100	10.4" Dual Scan	540MB	4949
486DX4/100	10.4" Dual Scan	810MB	5399
486DX4/100	10.4" Active	340MB	5599
486DX4/100	10.4" Active	540MB	5999
486DX4/100	10.4" Active	810MB	6399
486DX4/100	10.4" Active	540MB	7049 *
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Processor	Screen	Hard Drive	Price
486DX2/50	9.5" Dual Scan	340MB	$2699
486DX2/50	9.5" Dual Scan	540MB	3049
486DX2/50	8.4" Active	340MB	3099
486DX2/50	8.4" Active	540MB	3449

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- ▲ Plug and Play complaint
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- ▲ MS DOS, Windows 3.1

Processor	RAM	Hard Drive	Price
486DX2/50	4MB	270MB	$1149
486DX2/66	8MB	420MB	1529
486DX4/100	8MB	420MB	1719

COMPAQ color monitors start at $279.99

Contura 410

- ▲ 486DX2/50 processor
- ▲ 4MB RAM expandable to 20MB
- ▲ 2 Type II or 1 Type III PCMCIA slot
- ▲ Large built-in trackball
- ▲ MS-DOS, Windows 3.11, Tabworks, Lotus Organizer

Display	Hard Drive	Price
9.5" Dual Scan	350MB	$2369
8.4" Active	350MB	2839

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- ▲ 2 Type II or 1 Type III PCMCIA slots
- ▲ MS-DOS 6.2, Windows 3.1, MS Video for Windows Run Time, Tabworks

Processor	Screen	Hard Drive	Price
486DX4/75	9.5" Dual Scan	340MB	$3129
486DX4/75	9.5" Dual Scan	510MB	3499
486DX4/75	10.4" Active	510MB	5029
486DX4/75	10.4" Active	810MB	5389

Business Lease: $103/mo.

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Model	RAM	Hard Drive
486DX2/66	8MB	540MB
486DX2/66	4MB	540MB
486DX2/66	8MB	540MB
Pentium 75MHz	8MB	540MB
Pentium 75MHz	8MB	1GB
Pentium 90MHz	8MB	1GB
Pentium 100MHz	8MB	1GB

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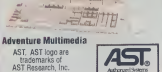

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- ▲ PanVision graphics for up to 1024x768 resolution
- ▲ 2 Type II or 1 Type III PCMCIA slot

Processor	Screen	Hard Drive	Price
486DX2/50	10.3" Dual Scan	340MB	$2749
486DX4/75	10.3" Dual Scan	510MB	3149
486DX4/75	10.4" Active	510MB	4129
486DX4/75	10.4" Active	700MB	4519

Ascentia 910N

Ascentia 810N

- ▲ LARGE, 10.4" Dual Scan displays
- ▲ 4MB RAM expandable to 20MB
- ▲ Removable hard drive and floppy drive
- ▲ 2 Type II or 1 Type III PCMCIA slot

Model	Screen	Hard Drive	Price
486DX2/66	10.4 Dual Scan	250MB	$ 2399
486DX2/66	10.4 Dual Scan	340MB	2539
486DX2/66	10.4 Dual Scan	510MB	2689

Business Lease: $88/mo.

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- ▲ PCI Local bus graphics and hard drive
- ▲ 1280x1024 resolution

Processor	RAM	Hard Drive	Price
Pentium 75MHz	8MB	850MB	$1609
Pentium 75MHz	8MB	1.275GB	1929
Pentium 75MHz (MT)	16MB	1.275GB	2299
Pentium 100MHz	8MB	1.275GB	2419
Pentium 100MHz(MT)	16MB	1.275GB	2759

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- ▲ MS-DOS, Windows for Workgroups, RunTime Video for Windows, Windows Sound System

Processor	Screen	Hard Drive	Price
486DX4/75	10.4" Dual Scan	500MB	$3639
486DX4/75	10.4" Active	500MB	4749

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- ▲ 82-key keyboard
- ▲ MS-DOS, Windows 3.1
- ▲ Accupoint pointing device
- ▲ Enhanced power management

	Model	Processor	Screen	Hard Drive	Price
	T2100	486DX2/50	9.5" Mono	250MB	$1439
	T2100	486DX2/50	10.4" Dual Scan	330MB	2249
	T2100	486DX2/50	8.4" Active	330MB	3099
Pro Series	T2400	486DX2/50	9.5" Dual Scan	250MB	2279
	T2400	486DX2/50	9.5" Dual Scan	320MB	2449
	T2400	486DX2/50	8.4" Active	250MB	2889
	T2400	486DX2/50	8.4" Active	320MB	2949
	T2450CT	486DX4/75	9.5" Active	320MB	3899
	T2450CT	486DX4/75	9.5" Active	500MB	4199

Business Lease: $53/mo.

T2400

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$5499

- ▲ 10.4" active matrix color display
- ▲ 772MB hard drive, 8MB/40MB
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ 1 Type II and 1 Type III PCMCIA slot
- ▲ MS-DOS 6.21, Windows for Workgroups 3.11 and more

75MHz Pentium

T4700, T4800 and T4850

Sight, Sound & Processing Power

- ▲ Brilliant color display with local bus video
- ▲ 1 Type II and 1 Type III PCMCIA slot
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ MS-DOS, Windows for Workgroups 3.11, UltraFont, Video video compression software

Model	Processor	Screen	Hard Drive	Price
T4700	486DX2/50	9.5" Active	320MB	$2999
T4800	486DX4/75	9.5" Active	500MB	4189
T4850	486DX4/75	10.4" Active	500MB	4519
T4850	486DX4/75	10.4" Active	772MB	4829

Portégé T3600

Award-Winning Subnote

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- ▲ 8MB RAM expandable to 24MB
- ▲ PCMCIA Type II slot
- ▲ External 3.5" diskette drive
- ▲ Integrated Accupoint pointing device

Processor	Screen	Hard Drive	Price
486DX2/50	8.4" Active	500MB	$3719

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- ▲ 16-bit sound card
- ▲ Integrated pointing device
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Processor	Screen	Hard Drive	Price
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486DX2/50	8.4" Active	455MB	2629
486DX4/75	9.5" Dual Scan	455MB	2799
486DX4/75	8.4" Active	340MB	3069
486DX4/75	8.4" Active	455MB	3319
486DX4/100	9.5" Active	525MB	4279

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256K CACHE

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VESA LOCAL BUS VIDEO & LOCAL BUS IDE

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EXTRA PORTS

NP8500

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It's easy to see the advantages of our NP8500 with oversized screen. Your graphics never looked better or moved faster. The 11.3" dual scan color VGA display is the largest screen offered on a portable — providing a viewing area that's 41% larger than the standard 9.5" screen. Which will make it easier to see your graphics speed through the high-performance 32-bit VESA Local Bus Video with Windows Accelerator. Combine this with an advanced 16-bit audio system and a double life NiMH battery and you've got a notebook that gets noticed.

11.3" OVERSIZED DISPLAY

VESA LOCAL BUS VIDEO

DOUBLE LIFE NiMH BATTERY

TRUE SOUND AUDIO SYSTEM

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PENTIUM/486

Nothing can catch this portable when it's on the run. Our new NP7500 Pentium 90MHZ is the most advanced, highest performance notebook available today. It's also more powerful than most desktops. The Pentium CPU has twice the performance of a 486 DX-2/66 and the capability to crunch more than 100 MIPS. Add to this a 256K cache and the unsurpassed performance of VESA Local Bus Video and Local Bus IDE, and this notebook will get you where you're going fast.

256K CACHE

VESA LOCAL BUS VIDEO & LOCAL BUS IDE

BUILT-IN AUDIO SYSTEM

PENTIUM POWER

NP 9500

- Intel upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- 256KB Secondary Cache Memory Expandable to 512KB or 1MB
- 16-bit Stereo Audio with 2 Stereo Speakers and 1 Microphone
- 4MB RAM Expandable to 64MB
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- Integrated Pointing Device Advanced Power Management with SMM
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- Extra Long Life NiMH Battery
- 1 16C550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support
- Other Ports: Ext. Keyboard, Ext. VGA Monitor, Game, Ext. FDD & 200 Pin Connector for Docking Station
- Jacks - 1 line in, 1 line out & 1 Microphone
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- Microsoft DOS 6.22
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- TV Tuner Module
- 2nd & 3rd Battery Module
- 3.5" Removable FDD Module
- Car Adapter
- Numeric Keypad
- Docking Station
- PCMCIA Cards

NP 8500

- 11.3" Dual Scan Color VGA Display CRT: 1024x768, 256 colors
- Intel Upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 16-bit Stereo Audio with 2 Stereo Speakers & 1 Microphone
- 4MB RAM Expandable to 20MB
- Removable 340MB Hard Drive (520, 810MB Optional)
- 3.5" 1.44MB Floppy Drive Replaceable with 2nd battery pack
- Simultaneous CRT & LCD Operation
- Integrated Pointing Device
- Intelligent Power Management w/ SMM
- 2 PCMCIA Type I & II or 1 Type III Slots
- Extra Long Life NiMH Battery
- 1 16C550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support
- Other Ports: Ext. Keyboard, Ext VGA Monitor & 200 Pin Connector for Docking Station
- Jacks - 1 line in & 1 line out
- 86-Key Keyboard
- Microsoft DOS 6.22
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- Weight 5.9lbs. with Battery
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- Numeric keypad
- Car Adapter
- PCMCIA Cards (Fax/Modem, Ethernet, SCSI & more)

NP 7500

Pentium:

- 256KB Secondary Cache
- 8MB RAM Expandable to 40MB
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- 1 Parallel Port with ECP/EPP Support

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- 1 Serial & 1 Parallel Port

- 1MB Video RAM
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- 32-bit Local Bus IDE
- 16-bit Stereo Audio with 2 Stereo Speakers & 1 Microphone
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- Car Adapter
- PCMCIA Cards (Fax/Modem, Ethernet, SCSI & more

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486DX2-66	$1725	$2125	$2695	$2925
486DX4-75	$1795	$2195	$2775	$2995
486DX4-100	$1825	$2225	$2795	$3025

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486DX2-66	$1975
486DX4-100	$2045

NP7500	9.5" MONO	10.3" COLOR DUAL SCAN	9.5" COLOR ACTIVE MATRIX
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486DX2-66	$1545	$1925	$2495
486DX4-100	$1625	$1995	$2575
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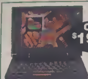

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The ImagiNation Network requires at least a 386 IBM PC compatible computer, a 2400 baud modem, a mouse,a keyboard, and at least 580 kb of available memory. Use of The ImagiNation Network requires a major credit card or checking account. I understand that my first month's membership is free and that it allows me five hours of network access. I understand there is no risk. If I am not having fun, I can call anytime to cancel my membership. Otherwise I'll just keep having fun!

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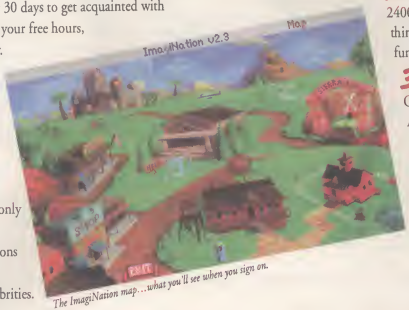

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2. You bet I have at least a 2400 baud modem. You think I want to have all this fun by myself?

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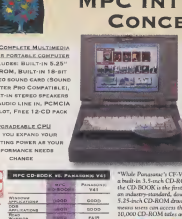

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Built-In Stereo Microphone	Built-In	Pair
Battery Life Capacity	60MIN	60MIN
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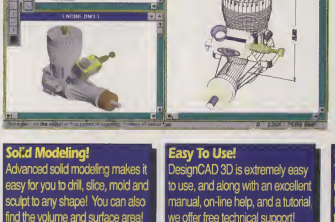

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SCSI			
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IBM

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1052MB	8.6ms	0662S12W	$699

Maxtor

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Plextor	PX43CS	4X	170ms	$339
Sony	CDU55S	2X	250ms	$169
Sony	SDU93R	2X	250ms	$149
IDE (ATAPI)				
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Sony	CDU55A	2X	250ms	$139

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SCSI Drive, sound card (in retail pkg)
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	PREM	PRO	SB	SA
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XM3501	$469	$609	$499	$529

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Multiple drives in a single enclosure.

	2 Drive	4 Drive	7 Drive
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2Gig	HP	35470	$759	$879
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4-8Gig	Conner	4324	$849	$969
4-8Gig	HP	35480	$869	$989
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A2842 VESA SCSI	$259	$249
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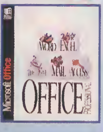

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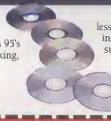

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N700, DX2/50, 10.4" color Active Matrix TFT, 340MB HDD, 8 MB RAM	$3,178
N700, DX4/75, 10.4" color Active Matrix TFT, 520MB HDD, 8 MB RAM	$3,678
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- Parallel, serial, CRT, keyboard/keypad/mouse, cable manager
- AT-compatible keyboard
- Built-in ergonomic track ball
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- Advanced Power Management System
- NiMH batts. operate up to 3 hrs; free AC voltage adapter
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- Free carrying case

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- AT-compatible keyboard
- Integrated, easy-to-use-in-tight-places pointing device
- Full business audio with built-in mic. and speakers
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- NiMH batts. operate up to 3 hrs; free AC voltage adapter
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System Requirements: 486SX at 25MHz or greater, IBM-compatible processor with SVGA (640 x 480 with 256 colors) or higher video, 8MB of RAM, dual-speed CD-ROM drive (300 Kbps), mouse, sound card, Windows™ 3.1 or later, DOS 5.0 or later. PC Computing CD-ROM Edition is $59 in Canada (includes Canadian GST and shipping charges), $79 in all other countries (includes air-mail shipping). The U.S. single-disc price is $14.95.

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Please answer questions below:

1. Where do you use your computer? (Check one only):
   A. ☐ Home B. ☐ Business C. ☐ Both
2. What kinds of computers do you use? (Check all that apply):
   D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible Desktop F. ☐ MAC
3. Do you plan to buy any of the hardware or software mentioned below in the next 12 months? (Check all that apply):

HARDWARE
G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE
Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility
Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/Compiler
2. ☐ Integrated/Multifunction
3. ☐ CAD
4. ☐ CD-ROM

4. From which of the following sources do you purchase personal computer products? (Check all that apply):
   5. ☐ Specialty Computer Retail Stores 7. ☐ Direct from Manufacturers
   6. ☐ Mail Order Firms 8. ☐ Other

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Please answer questions below:

1. Where do you use your computer? (Check one only):
   A. ☐ Home B. ☐ Business C. ☐ Both
2. What kinds of computers do you use? (Check all that apply):
   D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible Desktop F. ☐ MAC
3. Do you plan to buy any of the hardware or software mentioned below in the next 12 months?
   (Check all that apply):

HARDWARE
G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
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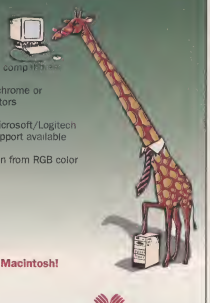

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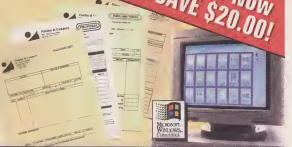

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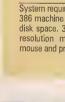

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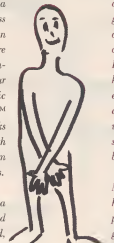

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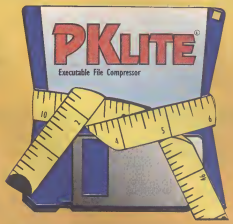

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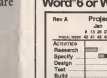

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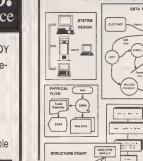

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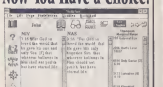

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Electronic Games Magazine Overall Rating: 9.0

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Software Watch 95

Your update on software trends and product advertising.

A Look At Software Buying

The more you and your business become reliant on computers, the more you demand applications that meet your specific business needs. It's not good enough to have a package that almost does what you need, or sort of does what you need. You want and need your software programs to do exactly what is required to accomplish the business challenge that's confronting today.

Fortunately for business computing buyers, software vendors have been working hard to meet your challenge. Publishers of suites and mainstream applications are constantly adding features and the smart buyer can use one package to serve many distinct business computing needs. Many smaller software publishers, on the other hand, are putting out packages tailored to the needs of specific departments and businesses—a variety of software products that do everything from managing your human resources to translating your business correspondence are being produced and sold. But there are plenty of needs that have not yet been filled and buyers should expect to see new generations of business-oriented software products developed to fill increasingly narrow niches.

Purchase Plans Among PC Computing Subscribers

Word Processing	48%
Graphics	44%
Speadsheet	39%
Database Management	38%
Accounting/Finance	25%
Project Management	14%
Statistical	9%
Mapping	7%

Source: PC Computing Purchase Plans Study, 1994

The payoff for software vendors is sales and a loyal customer base. The market for software applications of all types continues to grow, but some of the specific categories of software applications that have tapped a business need show the most rapid rate of advance. Forms software is a good example: barely a market in 1989, today it occupies a small but important and rapidly growing niche in the software market.

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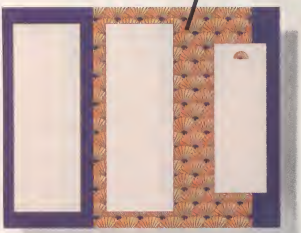

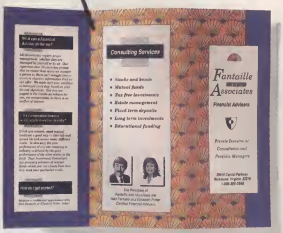

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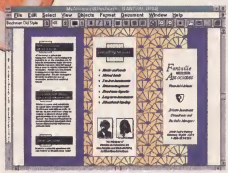

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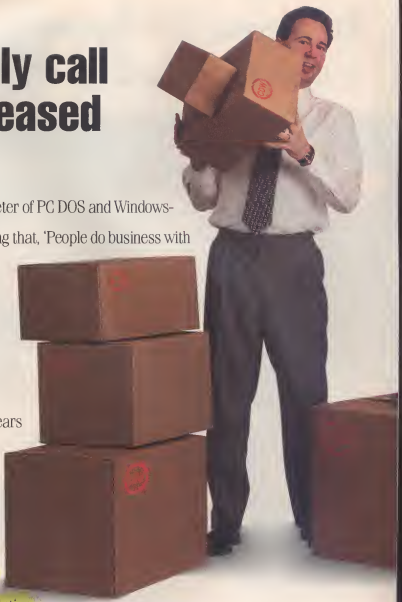

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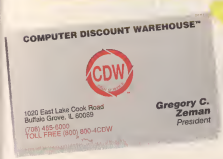

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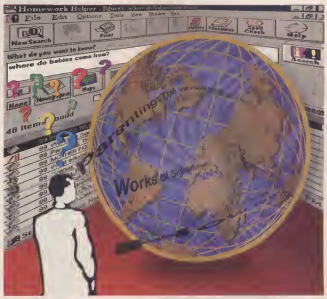

Answer Me This: Innovative new search tools let you phrase your online queries in plain English.

Infonautics' Homework Helper, which was recently launched on Prodigy (*jump homework helper*), lets you type questions in plain English. The utility then launches a comprehensive search through thousands of diverse sources, from encyclopedias and maps to newspapers and magazines.

Encyclopaedia Britannica, Architext Software, and InfoSeek are also riding the crest of the online natural-language query wave. Britannica Online (http://www1.eb.com:180/), which includes plain-English searching, is currently available only to colleges and universities, but should expand soon.

Silicon Valley–based Architext (http://www.atext.com/) and InfoSeek (http://www-.infoseek.com:80/Home) have both developed cross-platform natural-language search engines that offer the same usability edge as Homework Helper and Britannica Online but add even more features. Architext lets you search for information by concept rather than by keyword, and it supports multiple document formats. InfoSeek provides similar capabilities as Architext and scans a wide variety of content in its searches, including Web pages, Usenet newsgroups, computer publications, and newswires. Best of all, InfoSeek queries can cost as little as 10 cents each.

ONE-MINUTE GUIDE A/V Web: Indispensable Viewers and Players

In the fifties, if you wanted to enjoy a 3-D movie, you had to wear funky 3-D glasses. In the nineties, if you want to enjoy the wealth of multimedia on the Web, you need the right viewer or player. Some advice:

BUILT-IN IMAGE TOOLS Most Web browsers bundle viewing support for a wide variety of image formats, including native JPEG. But few, if any, bundle utilities for playing video or sound. Fortunately, most are available via anonymous FTP.

NCSA'S CORNUCOPIA NCSA (http://www.ncsa.uiuc.edu/SDG/Software/WinMosaic/viewers.html) has a section devoted to viewers and players such as:

LVIEW PRO—a GIF/JPEG viewer.

MPEGPLAY—a shareware MPEG player.

QUICKTIME—for Windows Media Player.

WHAM 1.31—for .au sound files.

WPLANY—to detect and play any sound.

PLEASE HANG UP AND TRY AGAIN These and similar files can be found all over the I-Way. If you reach a "busy" signal on one FTP server, look elsewhere. Also try ftp://oak.oakland.edu, http://wuarchive.wustl.edu/ or ftp://ftp.cica.indiana.edu. As a special bonus, look for vueply.zip on PC Contact, Library 0 (Windows Utilities), which includes most of the utilities listed above.

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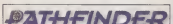

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http://www.halcyon.com/zipgun/mothercity/mothercity.html

By Rich Schwerin. *I-Way report to share? E-mail NetHead Rich Schwerin at* rschwer@pcc.ziff.com.

Free Stuff!

NetHead **Rich Schwerin:** You have a modem, so use it.

World Time Utility ***
From Bangkok to Baghdad, view current world time in more than 150 locations.
PC Contact: globe.zip/Library 8 **Site:** ftp://garbo.uwasa.fi/windows/util/wtime20.zip **Size/Time*:** 1MB/30

Windows Exit Utility ****
If that 5 p.m. log-off and shutdown procedure takes too long, try WinExit for a quick escape.
PC Contact: winext.zip/Library 0 **Site:** ftp://garbo.uwasa.fi/windows/util/csw/iwe14.zip **Size/Time*:** 70K/2

Audio CD Player ****
If you're not already enjoying audio CDs through your CD-ROM drive, check out this handy player.
PC Contact: cdplay.zip/Library 0 **Site:** ftp://oak.oakland.edu/pub/win3/cdrom/cdppro45.zip
Size/Time: 1MB/30

CAD Package *****
If the prospect of an easy-to-use CAD package for Windows interests you, try this on for size.
PC Contact: wincad.zip/Library 1 **Site:** ftp://oak.oakland.edu/pub/win3/cad/tscad20.zip **Size/Time*:** 1.3MB/33

Printer Utility for Cassettes ***
Print cool case liners for audio cassette tapes with this easy-to-use shareware.
PC Contact: casset.zip/Library 0 **Site:** ftp://garbo.uwasa.fi/windows/util/clinr2.zip **Size/Time*:** 98K/2

Mah-jongg (a.k.a. TaiPei) *****
Not since Tetris has there been a more addictive Windows game. Honest.
PC Contact: tdplay.zip/Library 8 **Site:** ftp://garbo.uwasa.fi/windows/educgames/taipei.zip
Size/Time*: 1.2MB/28

Screen Capture Utility *****
Need a quick, easy way to capture any screen image in one of many graphics formats? Try SnagIt 2.2.
Filename: snagit.zip/Library 0 **Site:** ftp://garbo.uwasa.fi/windows/util/snagit16.zip **Size/Time*:** 1.7MB/41

Backgammon ****
It's you vs. your CPU in this traditional backgammon game.
PC Contact: bakgam.zip/Library 8 **Site:** ftp://garbo.uwasa.fi/wndows/educgames/bg4win30.zip
Size/Time*: 1MB/35

Stamp Catalog ***
Philatelists rejoice! Catalog your collection of postage stamps in a handy Windows database.
PC Contact: stamp.zip/Library 1 **Site:** ftp://garbo.uwasa.fi/windows/util/am_st12.zip **Size/Time*:** 50K/1

*ALL DOWNLOADS ON PC CONTACT, FILE SIZE EQUALS ZIPPED BYTES. DOWNLOAD (IN MINUTES) AT 9,600 BPS
THE WEB IS DYNAMIC BY NATURE. WEB SITE URLs AND FTP SERVERS ARE SUBJECT TO CONSTANT CHANGE WITHOUT NOTICE

Package Deals: Coolware Wrapped and Ready

USENET NEWS REVIEW
Whether your interest lies in orchids or origami, there's a Usenet newsgroup for you. Here's a complete guide to Usenet and a Windows-based news reader to get you started.
PC Contact, Library 1
usenet.zip
2MB/35 Minutes
*****

FONT-O-RAMA
Stop using the same font day after day. Liven up that blasé presentation or report with a number of fonts, including the desktop publisher's nightmare: Ransom Note.
PC Contact, Library 8
fonts.zip
2MB/35 Minutes
****

GAMES PEOPLE PLAY
All work and no play? Say it ain't so. Grab our game pack and enjoy a half-dozen Windows freebies, including hangman, mah-jongg, backgammon, and other distractions.
PC Contact, Library 8
games.zip
2MB/35 Minutes
****

*NetHead Ratings: ***** Pacific Heights mansion. **** Co-op on the Upper West Side. *** Ranch home in the 'burbs. ** Claustrophobic dorm room. * Mosquito-infested pup tent.*

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Join PC Computing Online

PC Contact All public-domain and shareware programs and utilities featured in *PC Computing* each month are available on our online service, PC Contact. Current CompuServe or ZiffNet members type GO ZNT:PCCONTACT at any CIS) prompt. Cost varies depending on which CompuServe plan you belong to and the speed at which you connect. For complete membership and hourly rate information, type GO RATES while online.

ZiffNet users pay a monthly membership fee of $2.95. This support fee provides a variety of free and chargeable services. For the latest information about these services, type GO ZNT:ZIFFHELP and download the text files called GOWORD.TXT and FREE.TXT from data library 1 (ZiffNet Information).

Follow these steps to join ZiffNet and participate in the PC Contact forum:

1 Set these modem and software parameters: 7 data bits, even parity, 1 stop bit, full duplex.

2 Call CompuServe's sales department at (800) 848-8199 from the United States and Canada. From other countries, dial CompuServe direct at (614) 457-8650. You can also call CompuServe with your modem. Set your modem as instructed above and dial (800) 346-3247. Press Enter when your modem connects. Type PHONES at the HOST NAME prompt, press Enter, and follow the onscreen prompts to find a local access number.

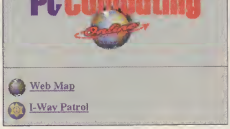
3 Dial the access number with a modem. When it connects to the network, press Ctrl-C to get the system's attention.

4 At the HOST NAME prompt, type CIS and press Enter.

5 At the USER ID prompt, type 177000,5300 and press Enter.

6 At the PASSWORD prompt, type PC/CONTACT and press Enter.

7 At the ENTER AGREEMENT NUMBER prompt, type PCC95 and press Enter.



Ultimate Web Map: Drop everything and point your browser to *PC Computing*'s all-new Web Edition, where you'll find a live, clickable I-Way map for supersurfing. Check it out at http://www.pc-computing.ziff.com/~pccomp/ and let us know what you think.

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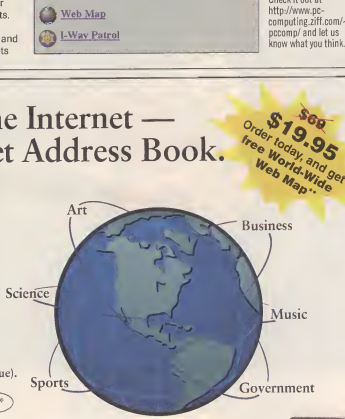

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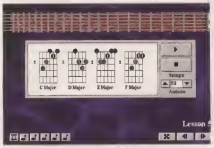
Circle 266 on reader service card.

CD-RONWhite

MUSICAL FANTASIES

I'm your average middle-aged white male. That means I have the singing voice of a rusty hinge and the rhythm of a stripped transmission. But I can dream, can't I? And I dream of being a musician. It's my rock-'n'-roll fantasy. Several recent CD-ROMs are the stuff dreams are made of. They show the musically challenged the stairway to heaven.



Now Form a Band: Here's one more chord than most rock bands know.

LEARN TO PLAY GUITAR ●●●

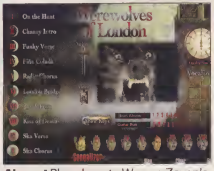
OK, if you're really serious about being a rock star, then check out Learn to Play Guitar. The instructor on the Windows disc is Cristof Flanders, a sincere-looking kid with hair down to his pecs. For those of us who haven't heard of him, he's introduced by a video in which he squats on the floor and plays mean electric guitar with lots of fast finger work and weird screeching. There are 11 lessons, and they cover the basics using videos, animations, and sound tracks. As far as someone as musically inept as I am can tell, they do the job. Absolutely nothing about the CD is splashy, except for Flanders's playing. The interface is crude but does the job. What surprises me is that someone else hasn't already done this with more polish.

Learn to Play Guitar / Cambrix Publishing / (800) 992-8781, (818) 992-8484 / $29 est. street price / *Reader Service No. 706*

ROCK 'N' ROLL YOUR OWN ●●●●

Too strumming-challenged to play guitar? Then load Rock 'n' Roll Your Own and make music with a more familiar set of instruments: your mouse and PC keyboard. Based on a slick interface from Medior, this disc has several collections of music loops, doo-wop vocals, and instrument licks. You tap keys and punch onscreen buttons with the mouse to lay down your own arrangements, which can be recorded, or you can just sit around like a fool making rock 'n' roll blare from your PC's speakers. In Rock 'n' Roll Your Own, the collections are presented as six stand-alone songs you've probably never heard of, except for Warren Zevon's "Werewolves of London."

Rock 'n' Roll Your Own / Compton's NewMedia / (800) 284-2045, (619) 929-2500 / $19 est. street price / *Reader Service No. 707*



Ahooo! Play along to Warren Zevon's magnum opus with your mouse.

MEGA ROCK RAP 'N' ROLL ●●●●

The collections of tunes in Mega Rock Rap 'n' Roll cover clearly defined musical styles: reggae, big band, blues, Latin, even rap (complete with bleeped words). Like Rock 'n' Roll Your Own, each screen on this disc takes on a visual life of its own to complement the style of music. Buttons that look like pinball flippers in one screen become bolt heads in another. Rock 'n' Roll Your Own adds animations to liven things up, while Rock Rap 'n' Roll gives you more options for the kinds of sounds you load into the buttons. But the differences between these discs are minor. If you go for one, you'll be a sucker for the other.

Mega Rock Rap 'n' Roll / Paramount Interactive/Viacom New Media / (800) 469-2539 / $19.95 est. street price / *Reader Service No. 708*

CLOSET CONDUCTOR ●●

Come on, I know you've done it. When no one was watching, you waved your arms around like a gooney bird while the stereo played the *William Tell Overture*. We all play maestro once in a while; Closet Conductor provides simple instructions—punctuated with bad jokes—on how to do it right. You can practice your newly acquired skills along with two audio CDs filled with the expected pop classics. But what you'll really want from Closet Conductor is the baton, a skinny white stick with a nice little cork handle. Personally, I think $30 is a bit steep for a stick. It's not like this is a virtual baton plugged into your PC that actually controls how music is played. It's just a stick with a cork handle. If you've got a collection of symphony music and a No. 2 pencil, you're already in business.

Closet Conductor / Intersound Multimedia / (800) 945-3059, (404) 664-9262 / $30 est. street price / *Reader Service No. 709*

●●●●● *Music of the celestial spheres.* ●●●● *Mick Jagger as Jumpin' Jack Flash.*
●●● *1977-era punk.* ●● *Your kid's first piano recital.* ● *A washboard and a stick.*

PHOTOGRAPH BY JAMES McGOON

CD-RONWhite

WORLD BEAT ○○○

World Beat is a pleasant enough CD-ROM trying to decide if it wants to be a guide to music around the world or a collection of album reviews. You find both here by clicking on a spinning globe to zoom in on a continent, and clicking from there to get a multimedia show about the music of smaller regions. MIDI tracks and onscreen scores let you break apart the components of a musical style, which is great if you want to know how a bossa nova is put together. The 7,239-strong album database and goodly proportion of reviews sound like a plus—that is, until you start searching through them. The only way to navigate is to scroll, which is oozingly slow. In addition, you can't play any songs listed in the database. And while there are three Paula Abdul albums, there's only one by Pink Floyd—putting them on a par with the Partridge Family and Peaches and Herb. Medio usually does better than this. They should toss the database, slick up the videos, and try again.

World Beat / Medio Multimedia / (800) 788-3866 / $30 est. street price / *Reader Service No. 710*

YES ACTIVE ○○○○

If you're going to be a complete couch potato about music, you won't find a better CD-ROM to spud around with than Yes Active. This Windows disc showcases seventies art rockers Yes. The profiles of individual members—complete with listings of their hobbies, color of eyes, and marital status—smack of fanzine. More insightful are the videos in which Yes members explain how they produce their heavily synthesized music and alternate versions of the same song. There are seven songs on the CD, complete with lyrics—although you can't play the music at the same time you read the lyrics. That's a surprising slip on a CD-ROM that's otherwise artfully produced and a pleasure to cruise through.

Yes Active / Compton's NewMedia / (800) 284-2045, (619) 929-2500 / $22 est. street price / *Reader Service No. 711*

TAKE YOUR BEST SHOT ○○○○

Try to imagine this: Your computer screen goes blank. An image of a fat pink man in a brown business suit moves slowly onto the display. Then the man reaches up

This Is Your PC on Plympton: Pick a punishment, any punishment.

and pulls his eyeballs out so they're dangling from his face by the optic nerves. Sound effects abound—an explosion, a slap, a grunt, a bell, some wet squishy sound you don't really want to identify. Either you're crazy or someone installed Take Your Best Shot on your PC—or both. Adapted from cartoonist Bill Plympton's animated film *Push Comes to Shove,* this Windows CD is a collection of games, screen savers, wallpaper, sounds, and icons. It's filled with exploding heads, decapitations, and other assorted mayhem, all directed at a pudgy character who could easily be an IRS agent, your boss, or anyone else you daydream about maiming. The games are simple—variations of Pong and other prehistoric games—but the demented spin on them is what counts. If you have a twisted mind, Take Your Best Shot will keep you occupied till they take you away.

Take Your Best Shot / 7th Level / (800) 884-8863, (214) 498-8100 / $20 est. street price / *Reader Service No. 712*

CROSS-SECTIONS STOWAWAY ○○○○○

Stephen Biesty's Incredible Cross-Sections Stowaway is supposed to be a game, something along the lines of Where's Waldo? But who would waste their time playing a pointless game when there's such a wonderful educational CD-ROM to explore? This disc is derived from just one section of Biesty's book, the one in which a sailing ship of yore is sliced crosswise into parts so you can explore every nook and cranny of the galleon in detail. The explorations include humans as well as timbers—the crew members' roles in the social and working life of the ship, their career paths, and how they might get killed. The illustrations are excellent, and they're supplemented by sound effects that seem to put the deck under your feet.

The official point of this disc is for you to find a youthful stowaway on the ship. CD-ROM makers too often plop some lame game onto an otherwise fascinating disc. It's as if *educational* has become a dirty label, like *lawyer* or *fried,* and we must be tricked into buying anything with educational value. The stowaway game is OK for kids, but it's nowhere near as imaginative and stimulating as the adaptation of Biesty's book.

Stephen Biesty's Incredible Cross-Sections Stowaway / DK Multimedia / (800) 356-6575, (212) 213-4800 / $42.95 est. street price / *Reader Service No. 713*

WELCOME TO WEST FEEDBACK ○○○○○

It was love at first sight—the ultimate air guitar. Plug the Virtual Guitar (pictured below) into your serial port, pop in the Windows CD-ROM, and suddenly you're playing along with Motley Crue, The Allman Brothers Band, and other bands. A moving bar at the bottom of the screen tells you when to strum, and the strumming magically turns into rhythm, lead, and stunt guitar parts—no skill required. You start in your bedroom, where an onscreen dude reacts to your playing. You graduate to the garage and finally to a videotaped audience. There are volume, distortion, and feedback controls—everything guitarists need to disturb their neighbors. There are even $20 follow-on CD-ROMs that expand the musical roster, including a video-packed Aerosmith disc. Bitchin'!

Welcome to West Feedback / Ahead / (800) 872-7627 / $85 est. street price / *Reader Service No. 714*

PHOTOGRAPH BY DAVID PERRY

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Circle 110 on reader service card.

Technolust

Lights, Camera, Action! Oh, and

BY MATTHEW LAKE

And now, coming to you live and loud from Silicon Central, the multimedia presentation of a lifetime: It's . . . whatever you're working on right now. Rattle their teeth with booming sound, knock off their striped ties with wide-screen overload, and wrap the whole thing up on your PC. Here's the latest gear you'll need to pull this off.

More Speeds It doesn't look like much, until you see the benchmarks. Plextor's plain-looking 6Plex CD-ROM drive sports out-of-the-ordinary audio controls. But there's more, much more. It transfers data at six times the rate of audio CDs—about right for full-screen, full-motion video. And none of its six speeds is 45 rpm. Can't be bad.

6Plex / Plextor / (800) 886-3935, (408) 980-1838 / $550 est. street price / *Reader Service No. 716*

PC Meets Cinemascope Try not to drool on this one: the Sony GWM-3000 wide-screen, 30-inch ultra-sharp monitor. It's so big, you can run Autodesk's Animator Studio in an 800-by-600-pixel window off in a corner while you use the rest of the screen to play golf. And it runs off an 8MB Imagine128 Pro board, among others.

Sony GWM-3000 / Sony Electronics / (800) 352-7669 / $21,000 est. street price / *Reader Service No. 717*

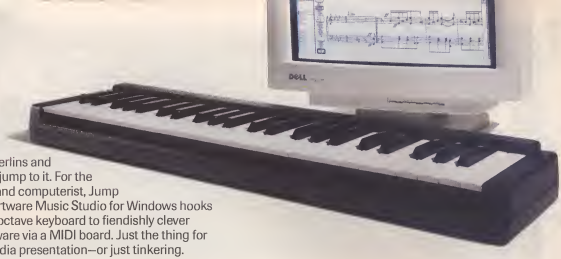
Animator Studio / Autodesk / (800) 879-4233 / $599 est. street price / *Reader Service No. 718*

Microsoft Golf / Microsoft Home / (800) 426-9400 / $65 est. street price / *Reader Service No. 719*

Imagine128 Pro / Number Nine / (617) 674-0009 / $2,999 est. street price / *Reader Service No. 720*

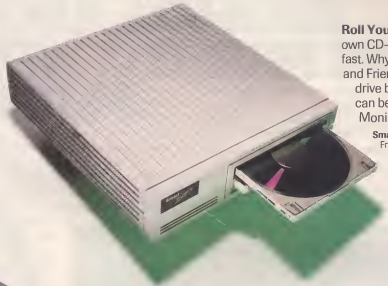
PHOTOGRAPHY BY STEVEN UNDERWOOD

Cue the PC



Play It Again
Weekend Irving Berlins and wired Gershwins, jump to it. For the closet composer and computerist, Jump Software's Concertware Music Studio for Windows hooks a functional four-octave keyboard to fiendishly clever composition software via a MIDI board. Just the thing for scoring a multimedia presentation—or just tinkering.

Concertware Music Studio for Windows / Jump Software / (415) 917-7460 / $299 est. street price / *Reader Service No. 721*



Roll Your Own—Fast! You need your own CD-ROM recorder. You also want it fast. Why not go for a drive like the Smart and Friendly CD-R 4000/C? As with any drive based on Yamaha technology, it can be turned into a lettered drive with Moniker's Spira software.

Smart and Friendly CD-R 4000/C / Smart and Friendly / (800) 366-6001 / $4,000 est. street price / *Reader Service No. 722*

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Manhattan Skyline Speakers Bose's tiny speakers and earthquake subwoofer (right) belt out the notes. The Altec Lansing ACS500 (left), with its 18-watt subwoofer (below), sounds as impressive as it looks.

Acoustimass Multimedia System / Bose Electronics / (800) 444-2673 / $700 est. street price / *Reader Service No. 724*

Altec Lansing ACS500 / Altec Lansing Multimedia / (800) 648-6663 / $389 est. street price / *Reader Service No. 725*

Ed Bott

CD-CENTRICITY

The Official Story: "Buying add-on multimedia components, such as CD-ROM drives and sound cards . . . has [become] cheap and easy; installing them has been a different matter. To put it mildly, installing a CD-ROM in a PC has required . . . patience. Support of Plug and Play in Windows 95 makes the prospect of adding a new multimedia device to a PC considerably less daunting." —*Introducing MS Windows 95* (Microsoft Press, 1995)

The Inside Story If you want to sell multimedia to the MTV Generation, you'd better have a great TV commercial. Microsoft's "Where do you want to go today?" spots are memorable because they're so inscrutable. IBM's I-wanna-get-Warped nuns are devastatingly funny. But Apple's Macintosh ads are the most wickedly effective of all.

Anyone with any couch-potato credentials has to remember the Apple ads: Frazzled father tries to install a multimedia upgrade kit in his Windows PC. Terminally cute child wonders out loud: "Where are the dinosaurs?" Father, hours later, is still wrestling with IRQs and CONFIG.SYS, while Junior puts on his coat and heads over to a Mac-equipped house.

If you're in charge of multimedia support at Microsoft, those Apple ads are a direct hit to the solar plexus. The simple, painful truth is that adding multimedia to a Windows 3.1 machine is unacceptably complicated, even for experts. It's Intel's platform, but it's Microsoft's problem.

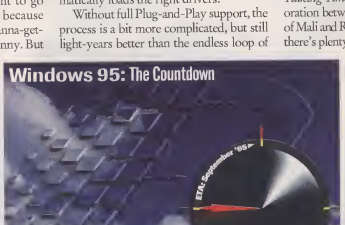
Does Windows 95 have the right stuff to take the bite out of Apple's ads? Here's a midyear performance review:

- **Plug and Play works (mostly).** Windows 95 doesn't remove the fundamental architectural flaw of the PC—its insistence on using a limited number of hard-wired interrupt request lines (IRQs) and base memory addresses. But it does put a slick, usable interface over the entire mess. Windows 95 scans the installed hardware in a system every time it starts up. When it finds a new device, it automatically loads the right drivers.

Without full Plug-and-Play support, the process is a bit more complicated, but still light-years better than the endless loop of reconfigure-reboot-repeat that makes PC multimedia so painful today. If you picked your hardware off the best-seller list, you're in great shape. The acid test for Windows 95 will come when its hardware detection capabilities run into obscure Far Eastern sound cards and CD-ROM drives.

- **Look for cool new tricks.** The multimedia modules in Windows 95 are full of pleasant surprises designed to outcool Apple. Do you like the Mac's automounting CDs? So did someone at Microsoft, which is why Windows 95 lets CD developers produce AutoPlay titles. When you insert a new CD that contains a file called AUTORUN.INF, it jumps straight to the installation routine. The next time you insert the same CD, it just starts playing.

There's cooler content, too, thanks to the new stamped multisession format. Developed by Sony and Philips, it allows CDs stuffed with music and digital data to play in any CD player—whether it's attached to your home stereo or your PC—without any fuss. Judging by a dazzling demo of *Talking Timbuktu*, a cross-cultural collaboration between guitarists Ali Farka Toure of Mali and Ry Cooder of the United States, there's plenty of coolness to go around.



Back to School? The March Preview edition of Windows 95 arrived right on schedule, which suggests that the shrink-wrapped version will hit store shelves in September.

- **CD-ROMs are taking the lead.** Yes, Windows 95 will be available on a CD. But this isn't just a new form of packaging; it's a whole new CD-centric way of thinking.

If you want the complete Windows 95 package—including documentation, an exhaustive library of drivers, and full network support—you'll have to buy the CD version. Microsoft rightly assumes that buyers without CD-ROM drives are probably less technically demanding, so if you order the floppy-disk version you'll forgo many of those goodies (you can download them).

Is all that multimedia consciousness enough to slice into Apple's usability lead? Stay tuned. . . .

PCC ON THE MSN: *Join Ed Bott and fellow* PC Computing *editors Yael Li-Ron and Matthew Lake on the Microsoft Network for a live conference on May 10, 1995, between 6 and 8 p.m. (PST).*

PHOTOGRAPH BY JAMES McGOON

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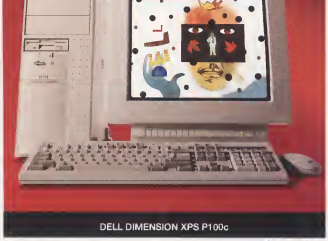

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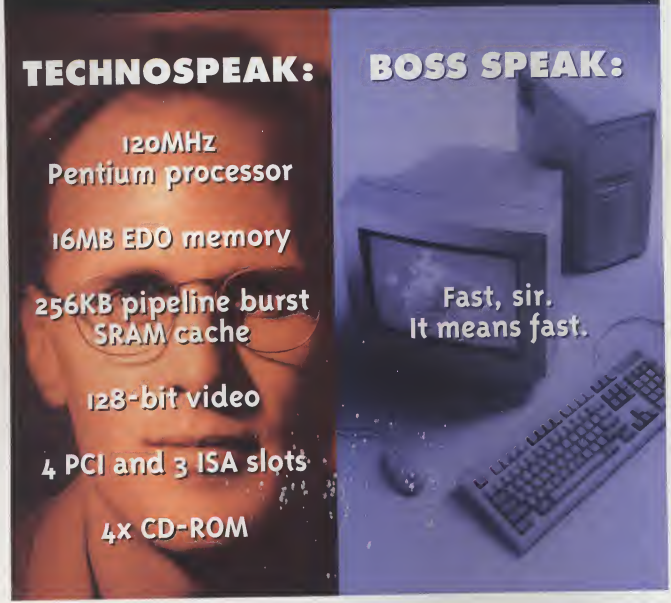

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